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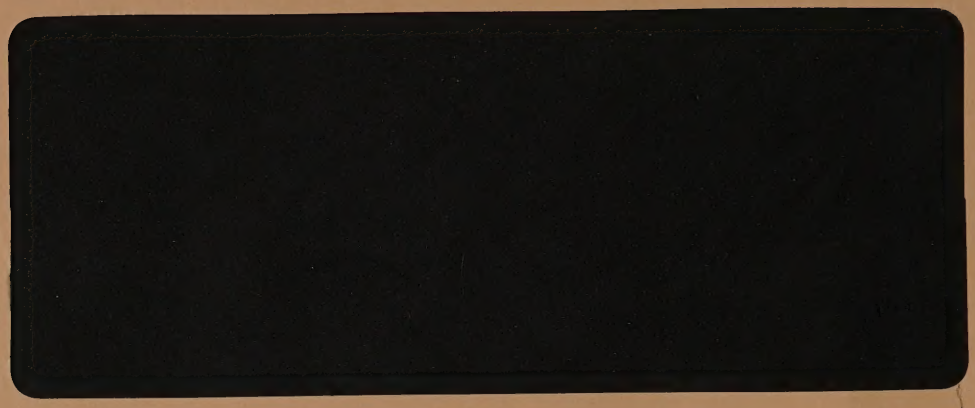

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REGIONAL SOCIOECONOMIC ANALYSIS OF TAR SANDS DEVELOPMENT IN UTAH

by

D.W. South, J.C. Nagle, J.W. Nagle,
and R.C. Winter

Energy and Environmental Systems Division
Economic and Social Sciences Section

July 1983

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PREFACE

Three socioeconomic technical studies were prepared to assess the potential effects of tar sands development in Utah. This report, which is the first of three, is a regional report. It was designed to evaluate the cumulative socioeconomic impacts resulting from the development of nine special tar sand areas (STSAs) designated in the hydrocarbon leasing program (Combined Hydrocarbon Leasing Act - Public Law 97-78). The two remaining reports, which are in preparation, are STSA-specific studies that address the potential socioeconomic impacts from the proposed conversion of existing federal oil and gas leases to combined hydrocarbon leases in the Sunnyside and Tar Sands Triangle STSAs.

After this work was completed, the Utah Office of the State Planning Coordinator, which was the source for much of our data, changed its name to the Utah State Office of Planning and Budget.

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SUMMARY

INTRODUCTION

The Combined Hydrocarbon Leasing Act of 1982 (Public Law 97-78) provides guidelines for converting federal oil and gas leases to combined hydrocarbon leases in Special Tar Sand Areas (STSAs). The STSAs are designated by the U.S. Department of the Interior as areas that contain substantial deposits of tar sands. Under a combined hydrocarbon lease, tar sands can be developed in addition to oil and gas. Before an oil and gas lease can be converted, however, the socioeconomic consequences of the combined hydrocarbon lease must be evaluated.

This report evaluates the socioeconomic consequences of developing the tar sands in nine STSAs in east-central Utah. Figure S.1 shows the STSAs and the counties that surround them. Effects of tar sands development were examined on several levels: regional, county, census county division (CCD), and community. Effects were projected over the 20-year period from 1985 to 2005 and are described for the five "window years" of 1985, 1990, 1995, 2000, and 2005.

To prepare this analysis, a four-step procedure was followed. First, the existing social and economic conditions of the region were described. Second, conditions were projected for the 20-year period under the assumption that no tar sands resources are developed. Third, the proposed tar sands developments were described. The descriptions included estimates of (1) production levels and (2) the work force required to mine the tar sands and to construct and operate the accompanying retort facilities. Descriptions were prepared for two scenarios; one assumed a high level of tar sands development and one a low level of development. Fourth, the impacts of these developments were projected for the 20-year period and each of these impacts was analyzed.

In addition to tar sands development, the development of other energy resources (such as oil shale and coal) in the same Utah region was examined. The socioeconomic impacts of these developments were estimated and added to the impacts of the tar sands developments.

Two socioeconomic models were used to collect and analyze data. The Utah Process Economic and Demographic Impact Model (UPED) was used to project aggregate impacts under the baseline conditions, the two scenarios for tar sands development, and the scenario for development of other energy resources. After these impacts were projected, the Spatial Allocation Model (SAM) was used to distribute the impacts among the communities, CCDs, and counties. The types of effects examined include, for example, impacts on population; number of households; employment; wages; per capita income; and elements of the public and private infrastructure such as housing, education, health care, and utilities. Because the Uintah and Ouray Indian Reservation takes up a large part of the area that was studied, effects on it were also examined.

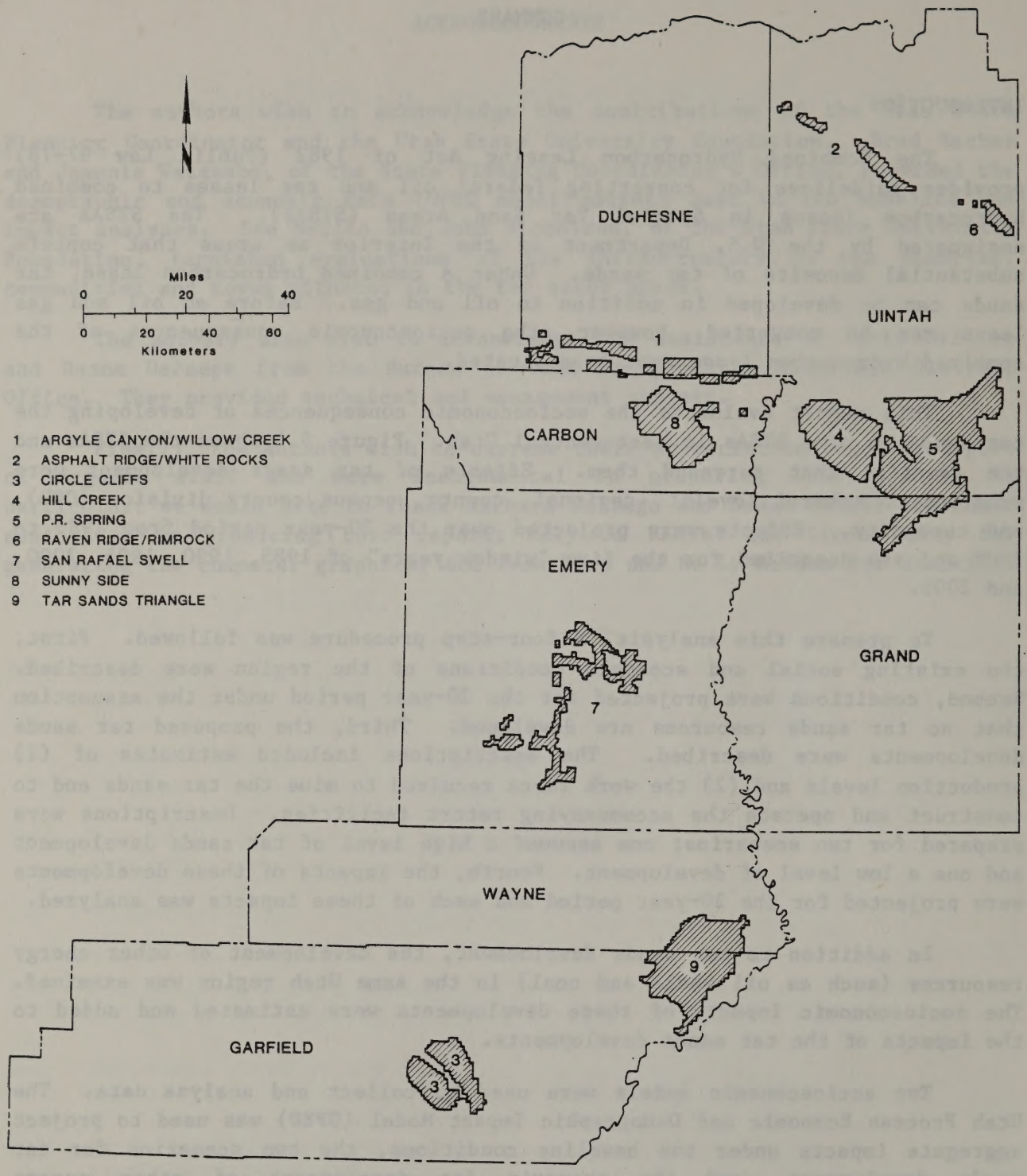

Fig. S.1 Special Tar Sands Areas and Surrounding Counties

DESCRIPTION OF TAR SANDS AREA

In step one of our analysis, we described the existing social and economic conditions in the region under study. The area under consideration consists of seven counties in east-central Utah: Carbon, Duchesne, Emery, Garfield, Grand, Uintah, and Wayne. Much of the region is sparsely populated. There were only 3.2 people per square mile in the region in 1980, ranging from 0.7 per square mile in Garfield County to 15 per square mile in Carbon County. In the state as a whole there were 17.8 people per square mile in 1980, while the figure for the United States was 64. Price and Vernal were the only two communities in the region with populations greater than 4,000 in 1980. No town had a population of more than 10,000 people.

The geography of the area has an obvious influence on the limited number of settlements. Canyons, cliffs, plateaus, and rugged terrain are common in the region. Water is often in short supply. Any development has to contend with the substantial physical barriers imposed by the region.

Traditionally, most of the region has been dependent on agriculture or energy development. As of 1980, mining was the principal employer in Carbon, Emery, and Uintah counties. Government was the primary employer in Duchesne, Garfield, and Wayne counties. Wholesale and retail trade was the predominant employer in Grand County. The region is well acquainted with the cyclical nature of industrial, especially energy-related, growth. The coal industry in Carbon and Emery counties, the uranium industry in Grand County, and most recently, the oil industry in Uintah and Duchesne counties have experienced frequent boom and bust periods.

In addition to the prospect of tar sands development, there are currently numerous other energy developments in the region. Coal production in Carbon and Emery counties has been stimulated by demand from local and out-of-state industries. Both oil and oil shale production are under way in Uintah County. The mines in Carbon and Emery counties and the oil developments in Uintah County are near local population centers, but the oil shale developments in Uintah County are somewhat removed from any cities. The projected tar sands developments in Carbon and Emery counties are located near local population centers. Tar sands areas in Garfield, Grand, Uintah, and Wayne counties are isolated from any significant concentrations of population.

Between 1970 and 1980, population grew in all the counties. The four most populous counties (Carbon, Duchesne, Emery, and Uintah) grew more rapidly than the state as a whole. With a population of 22,179, Carbon County was the largest of the counties in the region in 1980. The county grew 42% between 1970 and 1980. Duchesne County grew 72% in the 1970s, reaching a population of 12,565 in 1980. The population of Emery County increased by 125% between 1970 and 1980. Garfield County grew by only 16% in the 1970s, the least of any county in the region. Grand County increased by 23% between 1970 and 1980. Uintah County grew by almost two-thirds during the 1970s, from 12,684 in 1970 to 20,506 in 1980. Wayne County had a population of 1,911 in 1980, an

increase of 29% since 1970, but is still the smallest county in the region. Growth in the counties was due chiefly to the development of coal mining, petroleum, electricity generating, and oil shale industries.

Employment in the seven counties grew more rapidly than population from 1970 to 1980; it approximately doubled in four counties (Carbon, Duchesne, Emery, and Uintah) and increased by about 50% in two others (Garfield and Grand). Employment in Wayne County grew by about 33%. Within each county, employment growth varied widely by industrial sector. In general, growth was faster between 1970 and 1975 than between 1975 and 1980.

Per capita income also increased in all seven counties from 1970 to 1980. In 1980, it ranged from $6,239 in Wayne County to $9,105 in Carbon County.

The existing infrastructure services in 1980 were usually just sufficient to meet the needs of the population. The quality of services, however, varied substantially. For example, the capacity of water delivery and sewage systems was often inadequate for the number of people served.

PROJECTIONS OF BASELINE SOCIOECONOMIC CONDITIONS

Step two of our analysis was to project baseline socioeconomic conditions, assuming that no tar sands resources were developed, for the 1985-2005 period. Fig. S.2 illustrates the projected growth in the baseline population for each county. Most significant growth occurs between 1980 and 1995. The growth in number of households follows a similar pattern.

Baseline employment projected between 1980 and 2005 also follows this pattern. The fastest rate of increase occurs between 1980 and 1985 for most counties. However, Carbon and Uintah counties are expected to grow almost continuously throughout the period, while the other counties are forecast to have relatively little change between 1985 and 2005 -- less than 1% annually in most cases.

The baseline per capita personal income (PCPI) projections for the state are assumed to grow at an annual rate of 1.7%; by the year 2000, the state per capita income would be $11,568. Between 1985 and 2005, it is projected that all counties except Carbon would experience a 40.9% increase in per capita personal income. The PCPI for the state would also increase by 40.9% over this period. The 40.9% increase in both cases is a result of the assumed annual growth rate (1.7%).

All counties would experience a substantial increase in total personal income. In 2005, total personal income in Wayne County would be 94.6% greater than in 1985; in Garfield this figure would be 70.4%. Carbon County would still have the greatest total personal income: $469 million. In 2005, total personal income would be more than $100 million greater in Carbon County than Uintah County, a 33% difference.

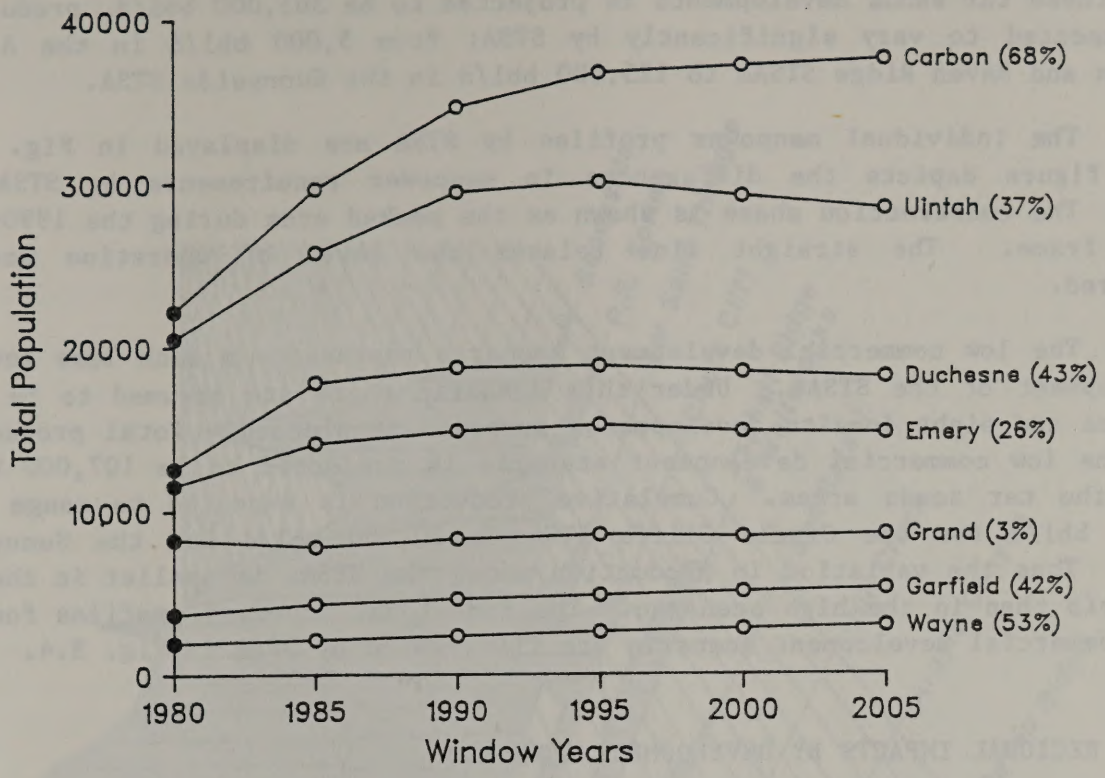

Fig. S.2 Baseline Population Projections by County, 1980-2005 (1980-2005 percent change in parentheses)

Baseline projections of infrastructure services were based on minimum state standards for provision of such services and the projected population. Consequently the growth of infrastructure services follows the same general pattern as population growth.

TAR SANDS DEVELOPMENT SCENARIOS

In step three, we developed two commercialization scenarios that correspond to the potential tar sands development alternatives. In the high commercial development scenario, total production of oil from tar sands is projected to be 365,000 barrels per day (bbl/d). Alternatively, under the low commercial development scenario 107,000 bbl/d would be produced. Both scenarios are based on company-specific project plans and expected future developments. Only the effects of development in the nine STSAs are directly considered in this report. Each STSA has a unique development schedule that extends between the years 1985 and 2005. In addition, this development schedule is often different for the two commercialization scenarios.

Under the high commercial development scenario there are assumed to be 11 surface and 8 in-situ tar sands developments. Although total production

from these tar sands developments is projected to be 365,000 bbl/d, production is expected to vary significantly by STSA; from 5,000 bbl/d in the Argyle Canyon and Raven Ridge STSAs to 125,000 bbl/d in the Sunnyside STSA.

The individual manpower profiles by STSA are displayed in Fig. S.3. This figure depicts the differences in manpower requirements by STSA and year. The construction phase is shown as the peaked area during the 1990-2000 time frame. The straight line relates the level of operation workers required.

The low commercial development scenario represents a much less intense development of the STSAs. Under this scenario there are assumed to be nine surface and eight in-situ developments proposed or planned. Total production for the low commercial development scenario is projected to be 107,000 bbl/d from the tar sands areas. Cumulative production is expected to range from 2,000 bbl/d for the Circle Cliffs STSA to 30,000 bbl/d for the Sunnyside STSA. Thus the variation in production among the STSAs is smaller in the low scenario than in the high scenario. The individual manpower profiles for the low commercial development scenario are illustrated by STSA in Fig. S.4.

TOTAL REGIONAL IMPACTS BY DEVELOPMENT SCENARIO

Two important assumptions underlie these impact projections. The first assumption is that the baseline projections accurately reflect the socio-economic composition of the counties in the periods under study. The second assumption is that the manpower requirements of each scenario would not change. Given these assumptions, the analysis is based on the difference between the baseline projections and the projections of each commercial development scenario. Thus all results are given as changes from the baseline projections, rather than total impacts.

Projected Impacts of the High Commercial Development Scenario

Under the high scenario, most regional impacts follow a pattern of rapid growth that peaks in 1995, declines slightly until 2000, then rises again (at a slower rate than from 1985-1995) through 2005. For example, population of the region would grow from 213 more than the baseline in 1985 to 53,091 more than the baseline in 1995 and then decline to 45,681 above the baseline in 2005. This growth corresponds to 214 times the baseline population level projected for 1985.

School-age population in the region would grow from 41 more than baseline in 1985 to 13,255 above the baseline in 2005 (a growth factor of 323), while retirement-age population would increase from being negligible relative to the baseline in 1985 to 13,205 above the baseline in 2005. The change in the number of households would grow 71.79% annually from 1985 to 1995 but then decline 2.63% annually from 1995 to 2005.

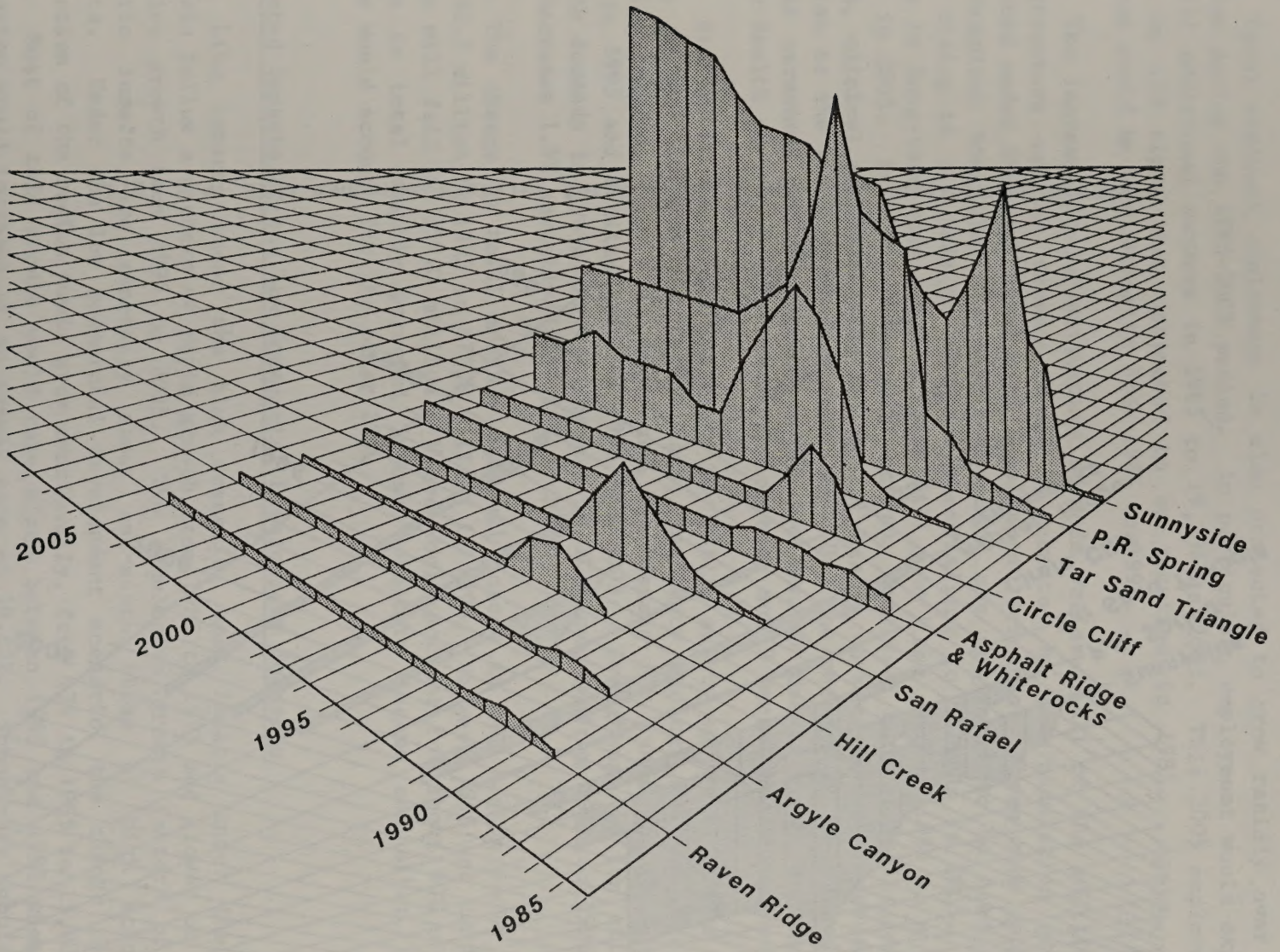

Fig. S.3 STSA Manpower Profiles for the High Commercial Development Scenario

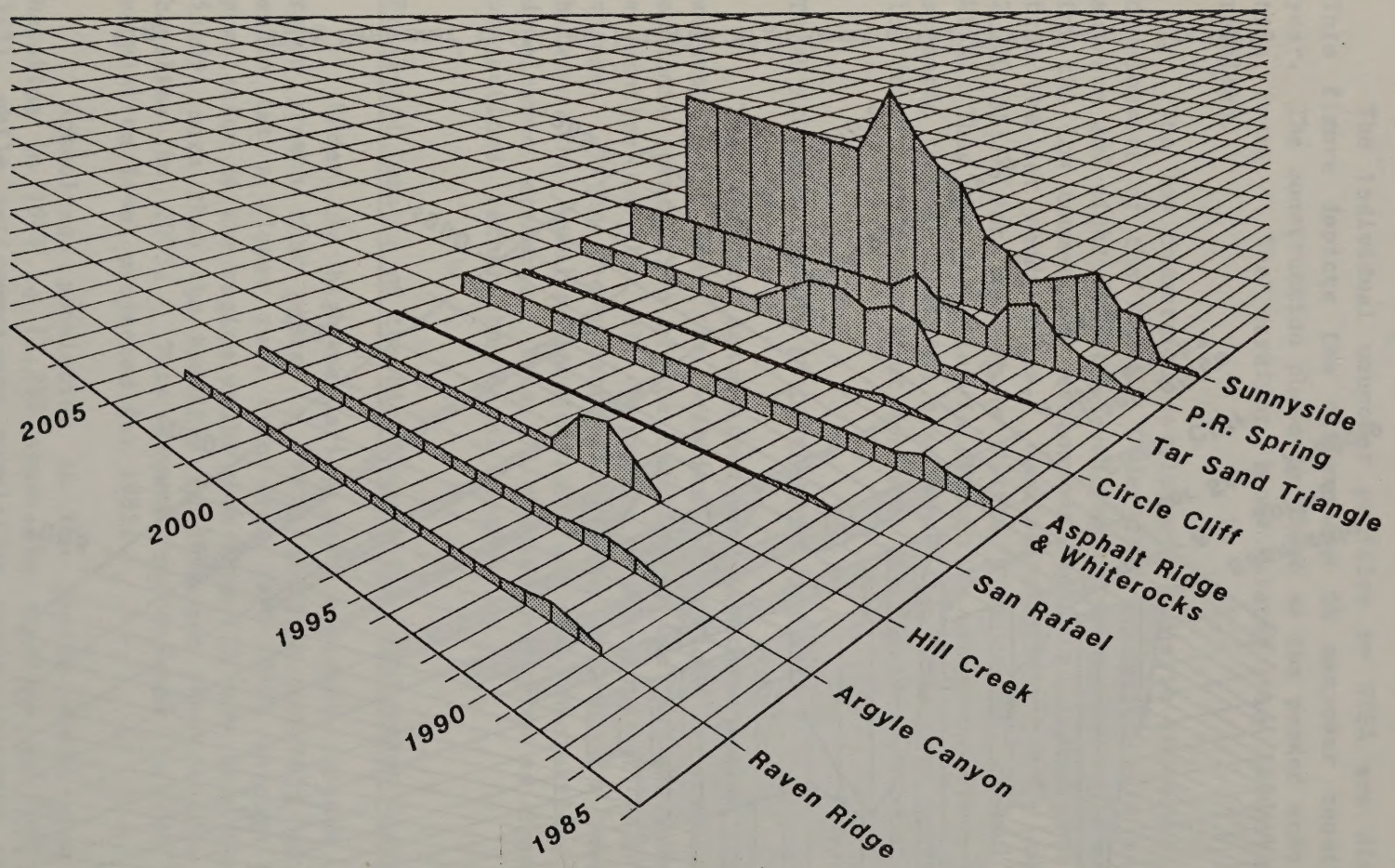

Fig. S.4 STSA Manpower Profiles for the Low Commercial Development Scenario

The change in the school-age population would create a demand for three more teachers and classrooms than the baseline in 1985, rising to 534 more teachers and classrooms than the baseline in 2005.

Total regional employment is also projected to grow rapidly over the baseline during the 1985-2005 period. In particular, employment would expand from 111 additional workers in 1985 to 19,236 in 2005. This 2005 employment level is 173 times that projected to be required in 1985. Again, this increase would be most dramatic from 1985 to 1995.

The increase in infrastructure demands varies. All of the additional infrastructure service demands would be created by the population growth projected under the high commercial development scenario. Three more general care hospital beds than the baseline demand are projected to be needed in 1985, rising to 111 beds in 1995 and then falling to 95 beds in 2005. The change in long-term care hospital beds will grow from zero in 1985 to a high of 62 in 2005. In 1985, three more doctors, dentists, nurses, public health nurses, clinical psychologists, and mental health workers would be needed in addition to the baseline projections. By 2005, the changes in the demand for medical personnel would increase to 30 doctors, 26 dentists, 81 nurses, 13 public health nurses, 8 clinical psychologists, and 9 mental health workers.

Similar increases are projected for public safety services such as jail space, police officers and patrol cars, emergency medical technicians, and juvenile holding cells. In each case, the demand for these services would peak in 1995 and decline between 1995 and 2005. The change in the utility service demands is projected to increase 73.3% annually from 1985 to 1995 and then decrease 1.5% annually from 1995 to 2005.

The change in total monthly personal income in the region would grow from $0.3 million in 1985 to $75.8 million in 1995. Between 1995 and 2005 the change will fall to $59.0 million. Wages would account for about 80% of the change in total monthly personal income; property income and other labor income would account for the other 20%.

Projected Impacts of the Low Commercial Development Scenario

Like impacts under the high scenario, most impacts under the low scenario follow a pattern of rapid growth from 1985 to 1995 and slower or even negative growth from 1995 to 2005. The cumulative growth factors of low scenario impacts are generally about one-sixth those of high scenario impacts. Under the low commercial development scenario, the change in the population of the region would grow continually, from 474 in 1985 to 15,034 in 2005. Most of this growth would take place between 1985 and 1995 when the population would increase at an annual rate of 39.82%. School-age population and retirement-age population would both increase at somewhat higher rates.

Total regional employment is also projected to grow rapidly over the baseline -- from 250 additional workers in 1985 to 6,111 in 2005. This 2005 employment level is 24 times that projected to be required in 1985. Again, this increase would be most dramatic from 1985 to 1995. In this period, total employment would rise 38.04% annually; in the next 10 years there would actually be a negative change, -0.27% annually.

The number of households would grow from 174 more than baseline in 1985 to 4,355 more than baseline in 1995, but it would then drop to 4,177 more than baseline in 2005.

As in the high scenario, the change in infrastructure demands varies by service category. Six more classrooms and teachers in 1985, and 188 more classrooms and teachers in 2005, would be needed to accommodate the change in the number of students from the baseline projections between 1985 and 2005. The change in the number of students would be 51 times greater in 2005 than in 1985, with most of this growth taking place from 1985 to 1995.

Over the 20-year period demands for the various health care services would grow by factors of 1.4 to 6.8 over the baseline. Public safety services would grow by similar factors, except for jail space. The 3,647 square feet needed for jail space in 1990 would be 15 times greater than the amount of jail space in 1985. The change in water system service demands would grow by a factor of 31 between 1985 and 2005.

The total monthly personal income in the region, as a result of the low commercial scenario developments, would grow from $662,002 in 1985 to $17,989,763 in 2005. Most of this increase would occur from 1985 to 1995, with only an 0.53% annual increase thereafter. The average monthly per capita income would fluctuate throughout the 20-year period, eventually declining seven dollars between 1985 and 2005.

Projected Impacts of the Other Energy Projects Scenario

In a third scenario, we estimated the socioeconomic impacts that may arise from the numerous energy projects other than tar sands that are planned or projected for development in east-central Utah. This report considered those that are located in the general proximity of the STSAs. The area that comprises these other energy projects includes four counties: Carbon, Emery, Duchesne, and Uintah. We assumed that the development of the other energy projects would have no effects on the other three counties studied.

There are nine oil shale projects anticipated in east-central Utah with a total production expected to be 370,500 bbl/d. There are also three tar sands projects anticipated in east-central Utah that are not directly analyzed in the previous two scenarios. Total oil production from tar sands is scheduled to reach at least 25,000 bbl/d; the Chevron/Great National project was not included in this production figure. Finally, there are 17 coal mines

proposed for development or expansion in Carbon and Emery counties. Total production is anticipated to reach 24 x 10^6 tons/y if all mines are developed according to the proposals.

All of the proposed oil shale projects and two of the tar sands developments are located in the area designated as the Uintah Basin (Duchesne and Uintah counties). Due to their location, the Asphalt Ridge, Raven Ridge, Hill Creek and P.R. Spring STSAs would have the greatest likelihood of being impacted by these energy projects. P.R. Spring has three energy developments within its borders. The P.R. Spring STSA is also adjacent to the largest proposed oil shale project in Utah.

Development of the Sunnyside, Argyle Canyon, and San Rafael Swell STSAs should not be negatively affected by the proposed oil shale and tar sands developments identified above. They may, however, be affected by the numerous coal mine developments. The Tar Sands Triangle and the Circle Cliff STSAs should remain virtually unaffected by these other energy projects because they are relative far from the proposed development sites.

Overall, the regional socioeconomic impacts under the other energy projects scenario are greater than those for either tar sands scenario. The most striking difference is in the amount of growth that occurs from 1980 to 1985. In 1985, the projected change in population is 36,244 in the other energy scenario compared to 474 and 213 in the low and high tar sands scenarios, respectively. In 2005, the change in population is 96,291 in the other energy projects scenario, compared to 15,034 and 45,681 in the low and high tar sands scenarios, respectively. The rate of growth, however, is slower for other energy project impacts than for impacts under either tar sands scenario.

Under the other energy projects scenario, the change in the regional population is projected to grow by 166% over the period studied, or more than 2.5 times what is projected to exist over the baseline in 1985. Two age groups are projected to increase at a much faster rate than the total population. School-age population is expected to expand by the greatest percentage, rising from 6,158 in 1985 to 32,508 in 2005 for a 428% increase. Likewise, retirement-age population is also forecast to rise dramatically from 394 in 1985 to 1,797 in 2005 for a 356% increase. The greatest growth in each population category would occur in the period from 1985 to 1995. Total population would rise 7.32% annually from 1985 to 1995, but only 2.74% annually from 1995 to 2005. The annual growth rates for school-age population are 11.85% and 5.59%, respectively, while for the retirement-age population they are 14.03% and 2.06%, respectively.

Total regional employment is also projected to grow rapidly over the 1985-2005 period. In particular, employment would nearly double from 21,089 additional workers in 1985 to 39,860 in 2005. Again, this increase would be most dramatic from 1985 to 1995. In this period, total employment would rise 4.63% annually; in the next 10 years the annual rate of growth would be only 1.85%.

New households are projected to grow by 146% during the period studied. In the year 2005, there would be 27,132 additional households, compared to only 11,019 in 1985. This growth would translate into an annual increase of 6.97% from 1985 to 1995, and 2.30% from 1995 to 2005. Once again, the 1985-1995 period is expected to experience the faster rate of growth.

Demands on the education system are projected to increase more than fivefold over the entire study period. A 427% overall increase in the number of students would translate into an 11.85% annual rate for the 1985 to 1995 period and 5.59% from 1995 to 2005. Students, classrooms, and teachers all would increase at the same rate because the community standards for classrooms and teachers are based on the number of students.

Health care, public safety, and utility services are also expected to realize a large growth in demand from 1985 to 2005, increasing to about 2.5 times their 1985 levels.

Total monthly personal income would increase by 4.92% from 1985 to 1995, and by 3.27% from 1995 to 2005. In 1985, total personal income in the region is projected to be greater than $51 million; this would increase to $114.8 million by 2005.

Average monthly per capita income would decrease by 2.23% annually from 1985 to 1995. This would be due mainly to the large projected decrease in employment within the construction sector; it is the only sector projected to experience a decline in employment during this 10 year period. Per capita wages in the region would rise by 0.61% annually from 1995 to 2005, as all sectors are projected to experience an increase in wage payments and employment in this time frame.

CUMULATIVE IMPACTS

Cumulative impacts indicate the effects produced by each tar sands scenario together with those attributable to the other energy projects. The result is the simultaneous population and employment growth that would arise due to the combined effects of all energy developments in the region.

Figure S.5 depicts total population growth projected to occur under the three scenarios: high and low tar sands development scenarios and the other energy projects scenario. The baseline population projection (i.e., without energy scenarios) is relatively flat through 2005. The energy scenario projected to cause the greatest population growth is the other energy projects scenario. Population growth attributable to this scenario would increase from 36,244 over the baseline level in 1985 to 96,291 in 2005. More importantly, this population growth is concentrated in four of the seven counties analyzed in the report: Carbon, Duchesne, Emery, and Uintah. Uintah County is projected to receive over 50% of the population growth in each window year.

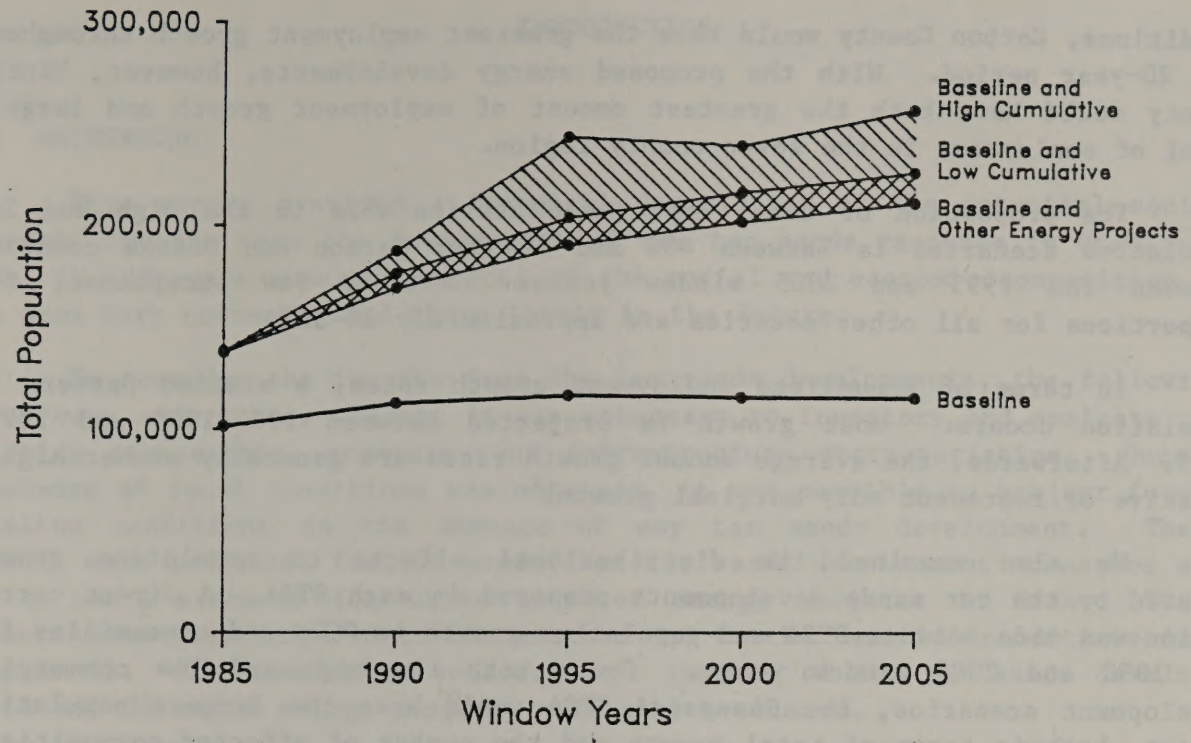

Fig. S.5 Total Regional Population Impact by Growth Stimuli

The high commercial tar sands development scenario is projected to generate the second largest increase in population. Population growth from this scenario is approximately three times as large as that associated with the low commercial development scenario, but generally one-half as large as predicted under the other energy projects scenario. Consequently, the high cumulative scenario (i.e., high commercial and other energy projects scenarios) is projected to induce the largest growth in population within the tar sands region. This growth would be concentrated in two counties: Carbon and Uintah. Within these two counties the population growth projected under the high cumulative scenario is between 45% and 68% of total population growth (baseline and high cumulative scenario) in the latter window years (1995-2005). Some of the other counties have a similarly high proportion, but their absolute population change is substantially smaller.

Expressed as an average annual percent change, most of population growth in the counties is projected to occur between the following window years: 1985-1990, 1990-1995. After 1995, the population growth rates by county are substantially smaller, and in some cases are negative. These trends occur under either cumulative scenario.

Employment impacts follow a pattern of growth similar to that of population. Furthermore, the relationship between scenarios resembles that shown in Fig. S.5 for population. Once again, Carbon and Uintah counties are projected to receive most of the impacts. Under projected baseline

conditions, Carbon County would have the greatest employment growth throughout the 20-year period. With the proposed energy developments, however, Uintah County would have both the greatest amount of employment growth and largest level of employment in the seven-county region.

The proportion of total employment attributable to the high and low cumulative scenarios is between 40% and 71% for Carbon and Uintah counties between the 1995 and 2005 window years. With a few exceptions, the proportions for all other counties are approximately 20-30%.

In terms of annualized employment growth rates, a similar pattern to population occurs: most growth is projected between 1985-1990 and 1990-1995. Afterwards, the average annual growth rates are generally either highly negative or represent only marginal growth.

We also examined the distributional effects on population growth created by the tar sands developments proposed in each STSA. A direct correlation was made between STSA and population growth in CCDs and communities for the 1990 and 2005 window years. Under both the high and low commercial development scenarios, the Sunnyside STSA would have the largest population impact, both in terms of total growth and the number of affected communities. Developments in the Asphalt Ridge/White Rocks, Hill Creek Raven Ridge/Rimrock and San Rafael Swell STSAs would also affect a substantial number of CCDs and communities.

1 INTRODUCTION

1.1 BACKGROUND

This report provides a technical description of the potential socioeconomic impacts from the development of the tar sands resource in Utah. As such, it addresses numerous aspects of the social and economic composition of the area both currently and those likely in the future.

To consider the impacts from the tar sands developments, the following steps were undertaken. First, it was necessary to inventory and evaluate the existing demographic, economic, and infrastructure characteristics. Once a knowledge of local conditions was obtained, it was possible to project future baseline conditions in the absence of any tar sands development. Then, impacts were projected for two predefined tar sands development scenarios and for a third scenario for other proposed energy projects in Utah. These impacts were then compared to one another and to the baseline conditions (see Chapter 6). The cumulative socioeconomic impacts of the tar sands developments and the other energy projects were also evaluated.

The impetus for this report was provided by the Combined Hydrocarbon Leasing Act of 1982 (Public Law 97-78). This act provides for the conversion of existing federal oil and gas leases in a Special Tar Sand Area (STSA) to combined hydrocarbon leases. A STSA is an area designated by the U.S. Department of the Interior as containing substantial deposits of tar sand. A combined hydrocarbon lease permits the development of tar sands in addition to oil and gas. However, before an oil or gas lease can be converted to a combined hydrocarbon lease, an evaluation of the socioeconomic consequences of such a lease is required.

Nine potential STSA developments in Utah have been identified for consideration here. These developments are located in east-central Utah, as seen in Fig. 1.1. The nine sites, further illustrated in Fig. 1.2, are situated in seven Utah counties: Carbon, Duchesne, Emery, Garfield, Grand, Uintah, and Wayne. The Asphalt Ridge/White Rocks and Raven Ridge/Rimrock STSAs are located in northern Uintah County. Argyle Canyon/Willow Creek STSA is located along the border between Duchesne and Carbon counties; Hill Creek is in southwestern Uintah County. Sunnyside STSA occupies much of eastern Carbon County. The P.R. Spring STSA extends from southeastern Uintah County into northern Grand County. The San Rafael Swell STSA is located in central Emery County. The Tar Sands Triangle Area is split between southeastern Wayne County and northeastern Garfield County. Lastly, the Circle Cliffs STSA is located in east-central Garfield County.

The proximity of the STSAs to existing population centers is shown in Fig. 1.3. The Asphalt Ridge/White Rocks and Sunnyside STSAs are located near numerous towns in Uintah and Carbon counties, respectively. Argyle Canyon/Willow Creek and San Rafael Swell STSAs are further removed from any

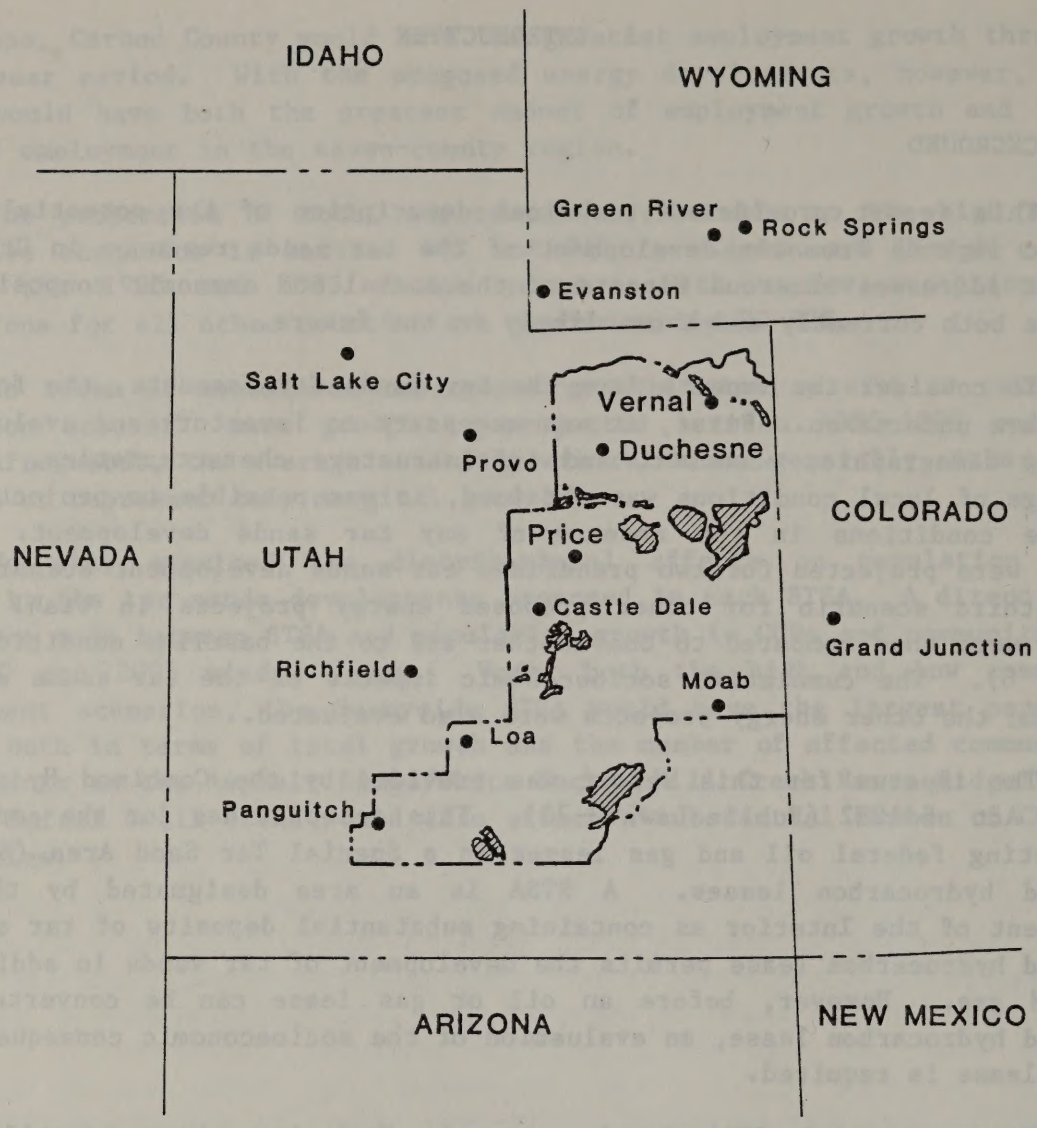

Fig. 1.1 Designated Special Tar Sands Areas in Utah: Areas of Potential Impact and County Seats

significant concentrations of population. The other STSAs are in relatively remote areas of the state.

1.2 ORGANIZATION OF REPORT

Pursuant to the requirements in the Combined Hydrocarbon Leasing Act, the purpose of this study is to evaluate the socioeconomic impacts of the conversion of oil and gas leases to combined hydrocarbon leases in specified STSAs. To accomplish this objective, the description of impacts is divided into two main parts: a regional analysis and a site-specific analysis. The regional analysis describes the wide spectrum of socioeconomic impacts resulting from all tar sands developments; the site-specific analysis

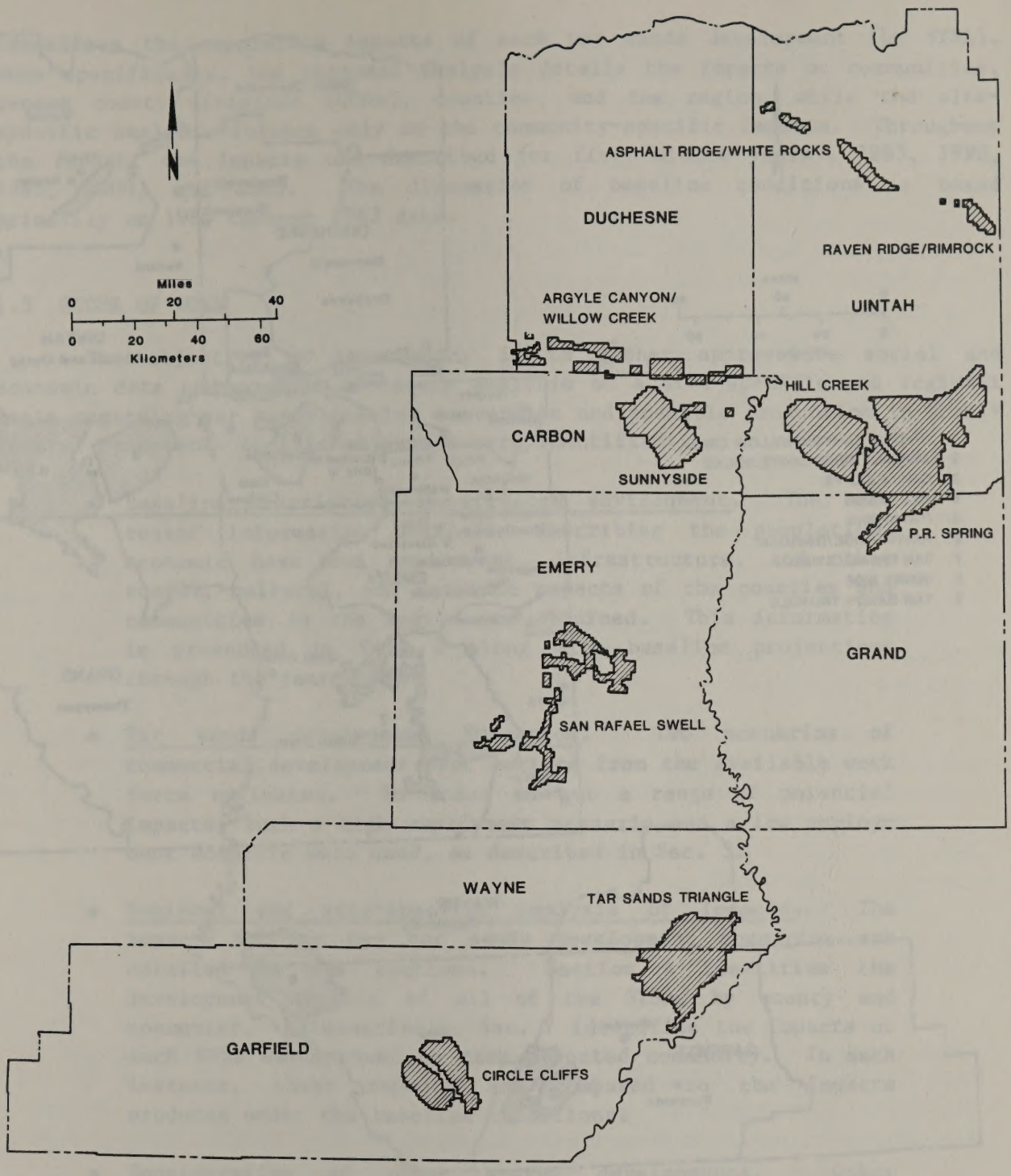

Fig. 1.2 Location of Designated STSAs within the Counties of East-Central Utah

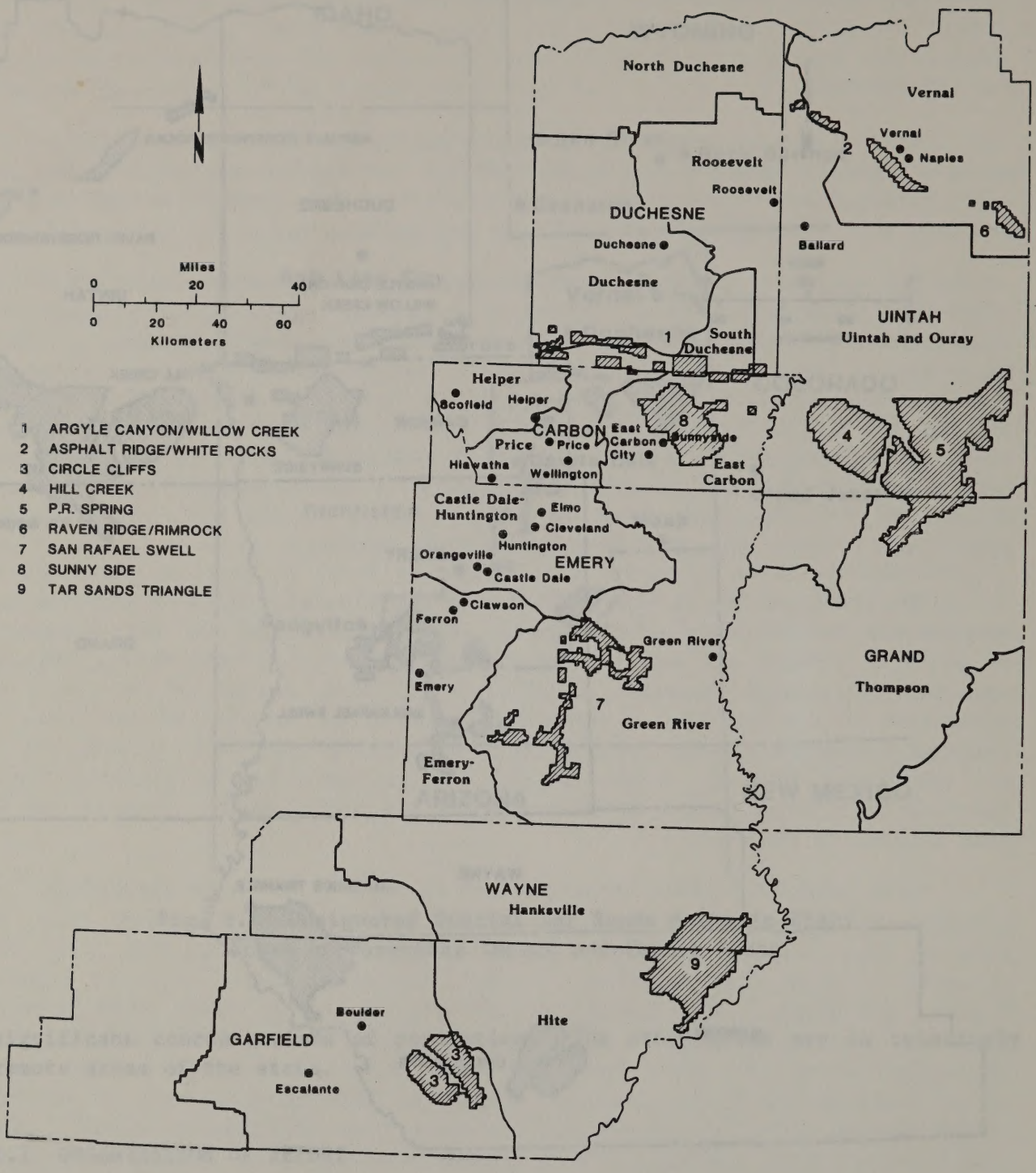

Fig. 1.3 Population Centers and Geopolitical Boundaries Within the Tar Sands Area: Communities, County Census Divisions, and Counties Being Studied

identifies the population impacts of each tar sands development (by STSA). More specifically, the regional analysis details the impacts on communities, census county divisions (CCDs), counties, and the region, while the site-specific analysis focuses only on the community-specific impacts. Throughout the report, the impacts are described for five "window years": 1985, 1990, 1995, 2000, and 2005. The discussion of baseline conditions is based primarily on 1980 through 1983 data.

1.3 SCOPE OF WORK

The objective of this study is to gather appropriate social and economic data and conduct necessary analysis on a site-specific and regional basis regarding tar sands leasing conversion and possible production in Utah.* Several components of this objective were identified:

- Baseline description of affected environment. The most recent information available describing the population, economic base and employment, infrastructure, and other social, cultural, and economic aspects of the counties and communities in the region was obtained. This information is presented in Sec. 2 along with baseline projections through the year 2005.

- Tar sands development scenarios. Two scenarios of commercial development were derived from the available work force estimates. In order to get a range of potential impacts, both a high employment scenario and a low employment scenario were used, as described in Sec. 3.

- Regional and site-specific analysis of impacts. The impacts of the two tar sands development scenarios are detailed in two sections. Section 4 identifies the development impacts of all of the STSAs by county and community. Alternatively, Sec. 7 identifies the impacts of each STSA development on each affected community. In each instance, these impacts are compared to the impacts produced under the baseline conditions.

- Consideration of other energy developments. Other potential energy developments in eastern Utah and their impacts on the region are covered in Sec. 5.

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*_Interagency Agreement between the Bureau of Land Management and the Department of Energy_, UT-930-1A3-101, p. 2.

- Evaluation of cumulative impacts. Section 6 summarizes the total impacts of the baseline changes, the development of the STSAs, and the other energy project developments.

The responsibility for the preparation of this report was shared among several contributors. The Office of the State Planning Coordinator, State of Utah, was designated by the Bureau of Land Management to use two of its socioeconomic models for data collection and analysis. The first model, the Utah Process Economic and Demographic Impact Model (UPED), was used to project the impacts of the baseline conditions, tar sands development scenarios, and other energy projects on population, households, employment, and income. The Spatial Allocation Model (SAM) was then employed to distribute these impacts among the communities, CCDs, and counties in the region. The Utah State University Foundation, under contract to Argonne National Laboratory, was assigned the responsibility of gathering information on the existing infrastructure in the seven counties and more than 20 communities of interest.

Argonne National Laboratory (1) provided the overall management and organization of the project, (2) collected information on the economic structure and existing sociocultural and housing conditions in the region, (3) analyzed and evaluated the baseline conditions and projected impacts, and (4) prepared this report.

A sequence of five principal activities was followed in the preparation of this report. First, the existing social and economic conditions of the region were described. Impact projections without the proposed action were then developed. Third, a description of the proposed action was produced, and next, the impacts of the proposed action were projected. Finally, each of the impacts was analyzed.

1.4 STUDY CONDITIONS

The counties and communities selected for inclusion in this report are those where "significant" population growth is projected as the result of the STSA development. "Significant" growth was defined to be a 5% annual population increase over the baseline in any one year. The counties and communities of interest were chosen based on the UPED population estimates.

Throughout the report, the impacts of the STSA and other project developments are expressed in terms of the difference between the baseline projections and the development projections. Thus, the increment of change created by the development is considered, rather than the total population, employment, or other impact in a given area. This clarification is also applicable to the baseline projection of infrastructure impacts.

Two important assumptions underlie the projections of impact from the developments. The first assumption is that the baseline projections

(described in Sec. 2) would accurately reflect the socioeconomic composition of the counties in the time periods under study. The second assumption is that the manpower requirements of the tar sands projects (described in Sec. 3) or the other energy developments (described in Sec. 5) would not change. Any variance from these conditions would necessarily influence the validity of the projections and the impact assessment.

Numerous assumptions were made in the development of the baseline projections, including the following:

- The recent national recession will not have a permanent effect on energy development in Utah or on the economy of the state in general.
- The proportion of the population in incorporated areas would remain roughly equal to the present distribution. This is in accordance with the development plans of the regional Association of Governments and county planning offices.
- The baseline projections would reflect the future based on the existing economic structure of the counties, CCDs, and communities.
- The proportional distribution of industrial sector employment among CCDs would remain constant into the future.
- The continuation of inter-CCD trade patterns.
- The baseline projections incorporate energy and manufacturing activities that would occur regardless of the scenario developments. See Appendix A.1.1 for a delineation of the specific activities by county.
- The baseline projections of economic activity are characterized by declining rates of growth over time. It is presumed that a local economy would stabilize as it matures. For accelerated economic growth to occur, basic sector employment must expand due to increased economic activity.
- County-level per capita income would approach the projected state per capita income. A growth rate of 1.7% per year is assumed for the state from 1985 through 2005.

A further description of the basis for the baseline projections appears in Appendix A.

Similarly, several assumptions and study conditions were employed in making the impact projections and preparing the impact assessment. Among these are:

- The alternative projections of development factor impacts for the tar sands projects are compared to the baseline projections. Only the change from the baseline conditions (impact increment) would be presented and assessed.

- The manpower profiles would be provided by the Bureau of Land Management (BLM) for the construction and operation phases of all projects to be considered (tar sands scenarios and other energy projects).

- UPED and SAM would be used to project the scenario impacts and spatially distribute the potential effects among the identified communities. The population would be spatially allocated according to commuting patterns, industrial sector trade patterns and area self-sufficiency.

- Trading patterns would shift in some areas but not in others, as a result of the tar sands developments.

- Any development of the magnitude being proposed would necessitate the creation of new communities in heretofore isolated areas.

- Personal income impacts are based on projected changes in population, industrial job mix, per capita income by source, and wage rates.

Appendix A contains the details of these and other assumptions and conditions used in the impact assessment process (projection and analysis).

2 DESCRIPTION OF EXISTING CONDITIONS AND BASELINE PROJECTIONS

The following section describes the existing conditions and the baseline projections of possible change in terms of the population, employment, services, and facilities in the area. Section 2.1 provides a general overview of the region. Section 2.2 describes the demographic conditions and trends in the area. This is followed by Sec. 2.3 which summarizes the principal economic activities in the area and the projections for future growth. Section 2.4 describes the infrastructure of the region, focusing on housing, education, health care, public safety, and utilities. Then, Sec. 2.5 analyzes the fiscal and management conditions of the counties and communities in the region. Finally, Sec. 2.6 provides some information on the quality of life in the area and Sec. 2.7 describes the Uintah-Ouray Indian reservation.

2.1 REGIONAL OVERVIEW

The area under consideration in this report consists of seven counties in east-central Utah: Carbon, Duchesne, Emery, Garfield, Grand, Uintah, and Wayne. Much of the region is sparsely populated. There were only 3.2 people per square mile in the region in 1980, ranging from 0.7 per square mile in Garfield County to 15.0 per square mile in Carbon County. In the state as a whole there were 17.8 people per square mile in 1980, while the figure for the U.S. was 64.0. Price and Vernal were the only two communities in the region with populations greater than 4,000 in 1980. No town had a population of more than 10,000 people.

The geography of the area has an obvious influence on the limited number of settlements. Canyons, cliffs, plateaus, and rugged terrain are common in the region. Water is often in short supply. Any development has to contend with the substantial physical barriers imposed by the region.

Traditionally, most of the region has been dependent on agriculture or energy development. As of 1980, mining was the principal employer in Carbon, Emery, and Uintah counties. Government was the primary employer in Duchesne, Garfield, and Wayne counties. Wholesale and retail trade was the predominant employer in Grand County. The region is well acquainted with the cyclical nature of industrial, especially energy-related, growth. The coal industry in Carbon and Emery counties, the uranium industry in Grand County, and most recently, the oil industry in Uintah and Duchesne counties have experienced frequent boom and bust periods.

In addition to the prospect of tar sands development, there are currently numerous other energy developments in the region. Coal production in Carbon and Emery counties has been stimulated by demand from local and out-of-state industries. Both oil and oil shale production are under way in Uintah County. The mines in Carbon and Emery counties and the oil

developments in Uintah County are near local population centers, but the oil shale developments in Uintah County are somewhat removed from any cities. The projected tar sands developments in Carbon and Emery counties are located near local population centers. Tar sands areas in Garfield, Grand, Uintah, and Wayne counties are isolated from any significant concentrations of population.

Numerous national parks, forests, and recreation areas have been designated in the state of Utah due to its abundance of natural environment and scenic beauty. Several of these designated areas are of concern to this study. Canyonlands and Capitol Reef National Parks and the Glen Canyon National Recreation Area are located adjacent to the Tar Sands Triangle and Circle Cliffs special tar sands areas. Bryce Canyon and Arches National Parks are also located within the region, but they are distant from the tar sands areas.

2.2 DEMOGRAPHIC CONDITIONS AND TRENDS

The state of Utah grew from a population of 1,059,273 in 1970 to a population of 1,461,037 in 1980. The growth rate in Utah was 37.9% (3.27% annually) in the seventies making it the fifth fastest growing state in the U.S. This population increase fluctuated considerably from county to county within the state. Of the counties of interest here, the four most populous counties (Carbon, Duchesne, Emery, and Uintah) grew more rapidly than the state as a whole. Conversely, the three least populous counties (Garfield, Grand, and Wayne) grew less rapidly than the state as a whole.

2.2.1 County Population Trends

Table 2.1 presents the 1970 and 1980 population levels for the potentially impacted counties and communities in Utah. The average annual compound percent change in population is illustrated to show the growth rate during this 10 year period. Figure 2.1 indicates the spatial distribution of the communities and counties within the region.

Carbon County

With a population of 22,179, Carbon County was the largest of the counties in the region in 1980. The county grew 42% between 1970 and 1980. Price, the largest city in the county and the region, has been a coal center since the 1890s. The city grew 3.87% annually during the 1970s, reaching a population of 9,086 in 1980. Located at the mouth of Price Canyon a few miles north of Price, Helper grew from a population of just under 2,000 in 1970 to over 2,700 in 1980. The neighboring towns of East Carbon and Sunnyside developed to provide commercial and residential services for the coal mines in the area. East Carbon, which was incorporated in the 1970s, and Sunnyside had the lowest growth rates of any city in the county between 1970 and 1980.

Table 2.1 Historical Population Levels for Potentially Impacted Utah Counties and Communities, 1970 and 1980

County/Community	1970	1980	Average Annual Compound Percent Change
State of Utah	1,059,273	1,461,037	3.27
Carbon County	15,647	22,179	3.55
East Carbon	1,808[a]	1,942	0.72
Helper	1,964	2,724	3.33
Hiawatha	166	249	4.14
Price	6,218	9,086	3.87
Scofield	71	105	3.99
Sunnyside	485	611	2.34
Wellington	922	1,406	4.31
Duchesne County	7,299	12,565	5.58
Duchesne City	1,094	1,677	4.36
Roosevelt	2,005	3,842	6.72
Emery County	5,137	11,451	8.35
Castle Dale	541	1,910	13.44
Clawson	-[a]	88	-
Cleveland	244	522	7.90
Elmo	141	300	7.84
Emery	216	372	5.59
Ferron	663	1,718	10.00
Green River	969	956	-0.13
Huntington	857	2,316	10.45
Orangeville	511	1,309	9.86
Garfield County	3,157	3,673	1.53
Boulder	93	113	1.97
Escalante	638	652	0.22
Hite CCD	4[a]	202	48.02
Grand County	6,688	8,241	2.11
Thompson CCD	4,793	5,333	1.07
Uintah County	12,684	20,506	4.92
Ballard	230[a]	558	9.27
Naples[b]	-	-	-
Vernal	3,908	6,600	5.38
Wayne County	1,483	1,911	2.57
Hanksville CCD	181	351	6.85

[a]Not incorporated in 1970.

[b]Newly incorporated, 1983 population estimate is 2,400.

Source: U.S. Department of Commerce, *1980 Census of Population: Number of Inhabitants, Utah* (1982).

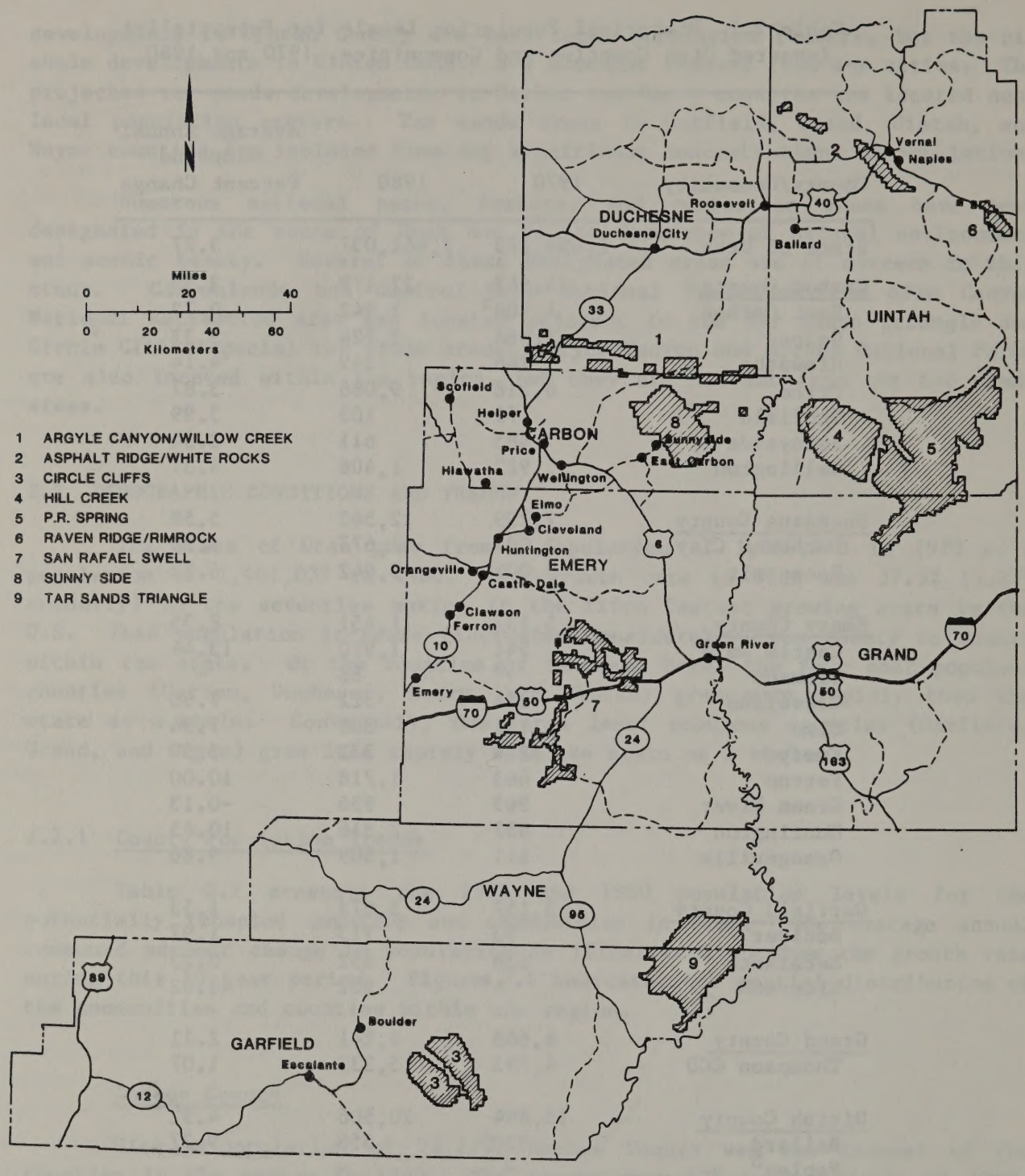

Fig. 2.1 Location of Counties and Communities in the Tar Sands Region of Utah

Wellington grew 4.31% annually during the 1970s -- the highest growth rate in Carbon County — and had a population of 1,406 in 1980. The population of Hiawatha jumped from 166 in 1970 to 249 in 1980, but it is still far below the 1,500 people who lived in the town during the coal boom days of the 1940s. Similarly, the old coal mining community of Scofield had a population approaching 2,000 in 1920, but even a 4% annual increase between 1970 and 1980 brought the population of the town to only 105.

Duchesne County

Duchesne County grew 72% in the 1970s, reaching a population of 12,565 in 1980. The growth of the petroleum industry was responsible for much of the growth in the county, particularly in the rural Uintah Basin area to the north and east of the city of Duchesne. Roosevelt grew 6.72% annually between 1970 and 1980, benefiting greatly from oil-related businesses and from its position in an open valley surrounded by flat-topped benches. The city of Duchesne, while isolated from most of the oil-related growth, increased from a population of 1,094 in 1970 to 1,677 in 1980.

Emery County

The population of Emery County increased by 125% between 1970 and 1980. Much of this growth can be traced to the construction of the Castle Dale Power Complex and the Huntington Canyon Power Complex, the largest complex of coal-fired electric generating plants in the state. The towns nearest the plants grew most rapidly. Huntington became the largest city in the county, growing 10.45% annually to a population of 2,316 in 1980. The neighboring towns of Castle Dale, Ferron, and Orangeville had annual growth rates of 13.44%, 10.00%, and 9.86%, respectively, during the 1970s. Although Green River was the largest city in the county in 1970, its location on the eastern border of the county excluded it from the electric power plant developments. Consequently, Green River was the only city in the region to lose population between 1970 and 1980. The city of Emery, while located south of the power plants, still grew by 5.59% annually between 1970 and 1980. Cleveland and Elmo shared in the growth from the power plants. Both cities doubled in population during the 1970s. Much of the population in the unincorporated areas of the county is located outside of Cleveland and Elmo.

Garfield County

Garfield County grew by only 16% in the 1970s, the least of any county in the region. The two cities in the area, Boulder and Escalante, changed little during the 1970s. The population of Boulder increased by 20 people between 1970 and 1980, while the population of Escalante increased by 14 people during the same period. Both towns were isolated by poor -- if any —

roads until recent decades. The rugged terrain and lack of water have inhibited growth in the county. In most cases, development has already occurred in the low flat areas where it is possible.

Grand County

The area in Grand County, where possible tar sands population growth would occur, has been described as utterly empty desert.* The population of the county increased by 23% between 1970 and 1980. There was less growth in the Thompson CCD, the area of interest here. Most of the people in the county live in the valley around Moab.

Uintah County

Uintah County grew by almost two-thirds during the 1970s, from 12,684 in 1970 to 20,506 in 1980. Vernal, the largest city in the county with a population of 6,600 in 1980, grew more than 5% annually between 1970 and 1980. Oil was responsible for most of the growth. Nonetheless, this growth was less than expected. The cancellation of oil shale and other energy projects in recent years has kept the increase in population below that which it might have been. Ballard and Naples, the two other communities of interest in the county, have been incorporated since 1970. The population of Ballard in 1980 was more than twice that of the then unincorporated area in 1970.

Wayne County

Wayne County had a population of 1,911 in 1980, an increase of 29% since 1970, but is still the smallest county in the region. Growth was much more rapid in the Hanksville CCD, the area of interest here. A total of only 351 people lived in the Hanksville CCD in 1980, however. The city of Hanksville did not have a paved access road until 1959, and is still separated from the rest of the county because of the rugged terrain, long distances, and absence of a suitable highway system.

2.2.2 Demographic Composition of the Counties

Figure 2.2 illustrates the distribution of the 80,616 people in the seven county region in 1980 by county. Figures 2.3-2.9 shows the distribution of population by community in each county. Table 2.2 summarizes the demographic characteristics of each county in 1980. The total population, population distribution by age, number of households, and households with families or retirement-age population are presented by county.

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*Roylance, W.J., *Utah: A Guide to the State, Special Tour Edition Part 2*, Utah: A Guide to the State Foundation, Salt Lake City (1982).

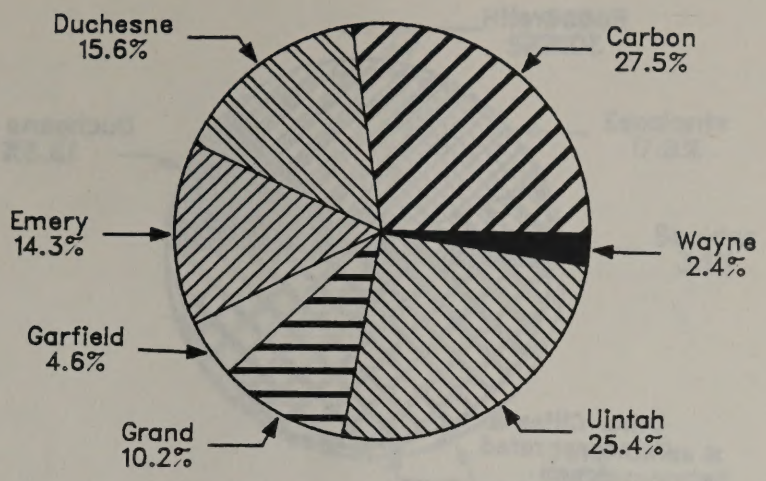

Fig. 2.2 1980 County Population Distribution in the Region

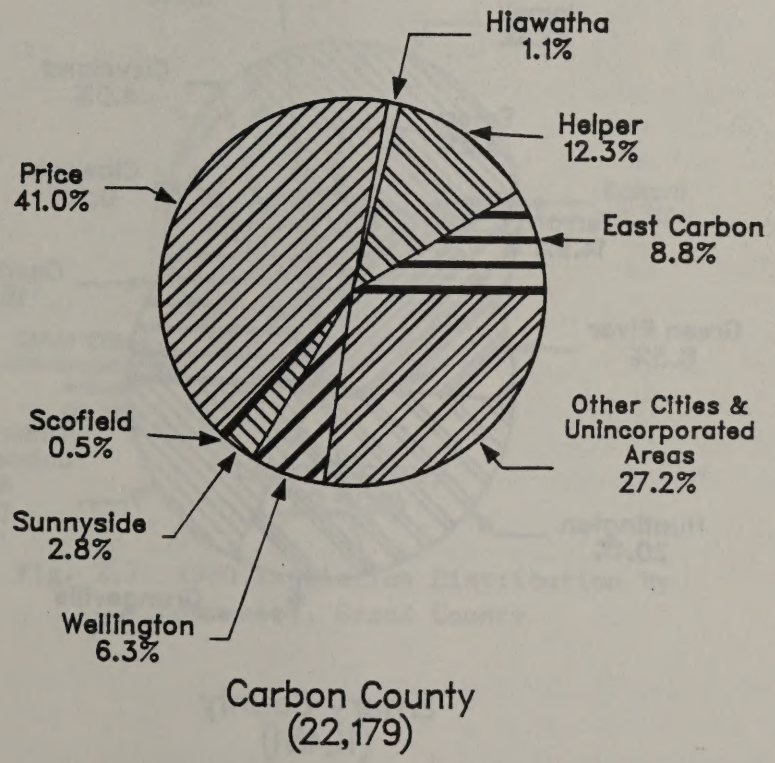

Fig. 2.3 1980 Population Distribution by Community, Carbon County

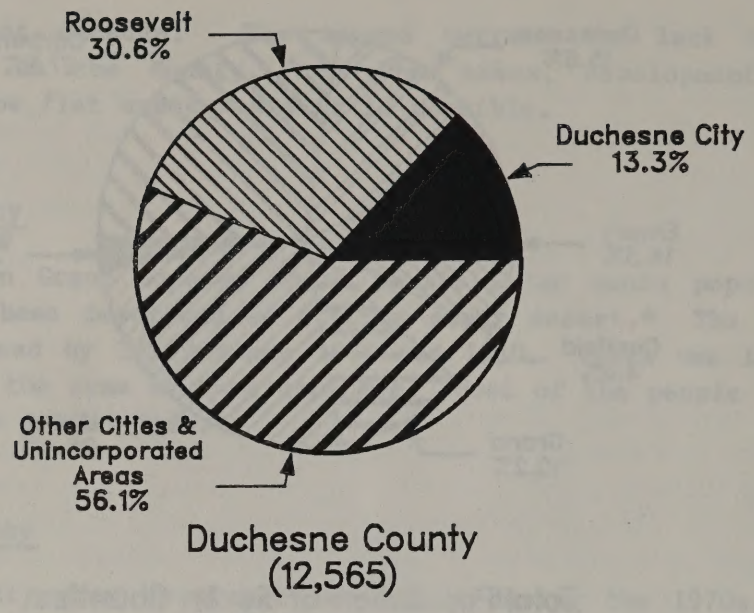

Fig. 2.4 1980 Population Distribution by Community, Duchesne County

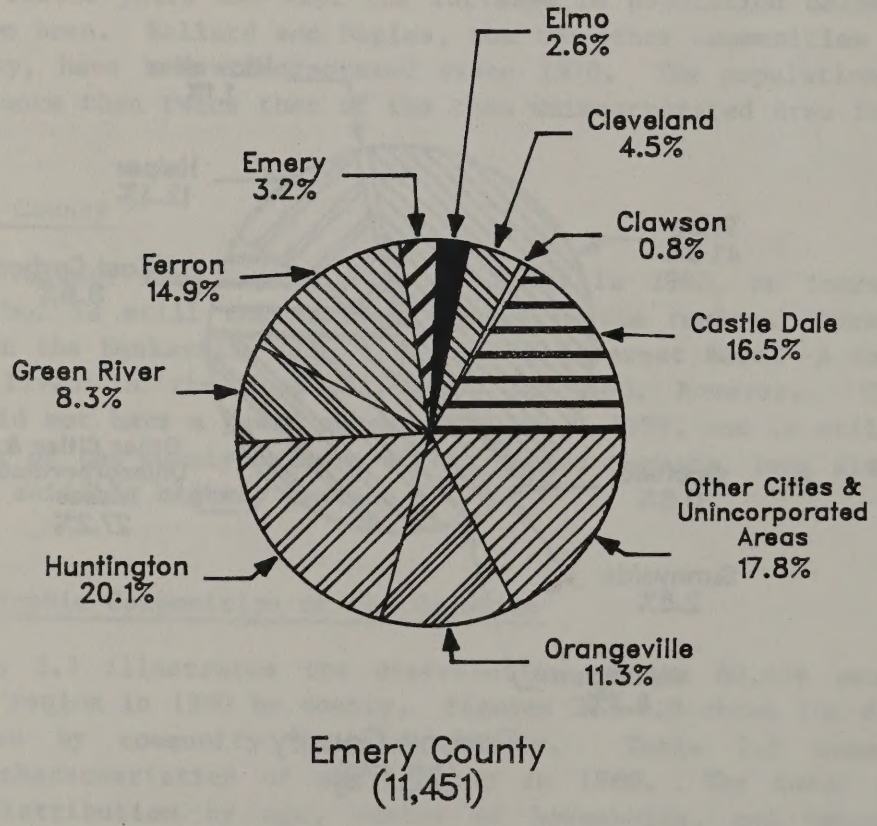

Fig. 2.5 1980 Population Distribution by Community, Emery County

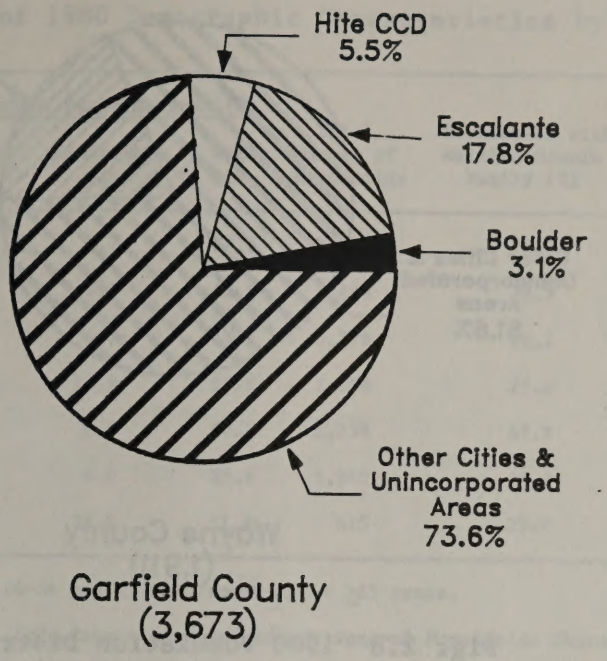

Fig. 2.6 1980 Population Distribution by Community, Garfield County

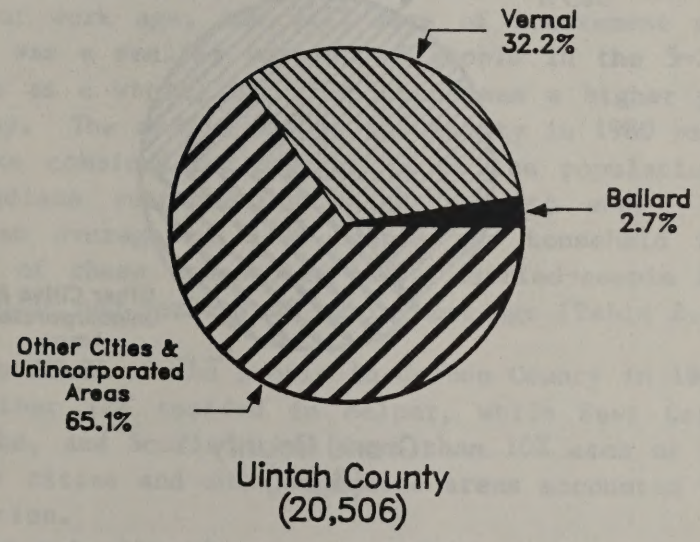

Fig. 2.7 1980 Population Distribution by Community, Grand County

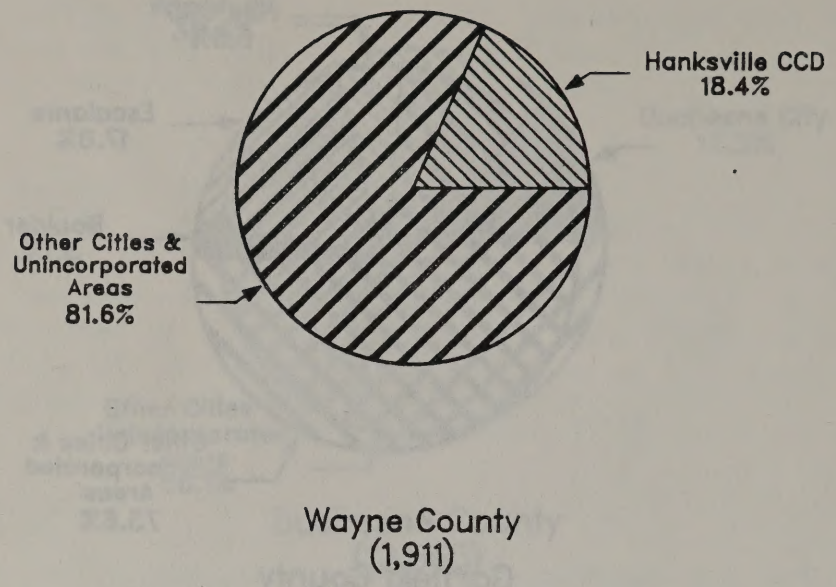

Fig. 2.8 1980 Population Distribution by Community, Uintah County

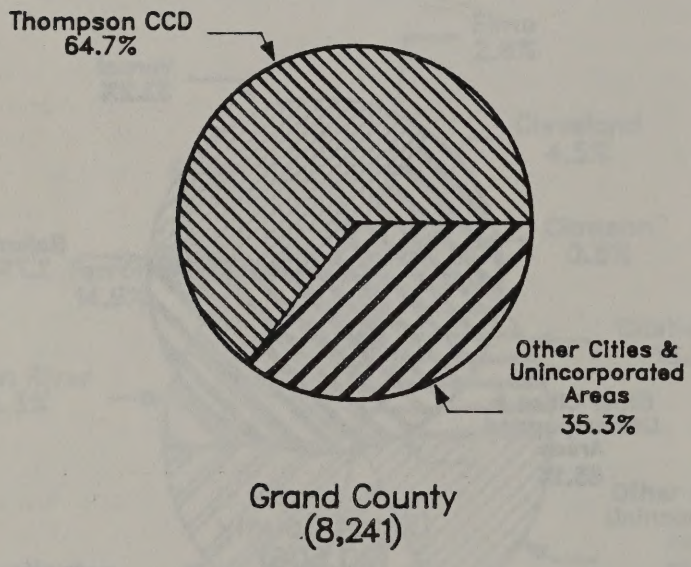

Fig. 2.9 1980 Population Distribution by Community, Wayne County

Table 2.2 Summary of 1980 Demographic Characteristics by County

Utah Counties of Interest	Total 1980 Population	Population Distribution[a] (%) School Age	Retirement Age	Work Age	Total Number of Households	Households with Married-Couple Family (%)	Households with Retirement-Age Population (%)
Carbon County	22,179	20.1	9.7	57.6	7,242	70.9	19.9
Duchesne County	12,565	25.9	6.8	52.5	3,499	78.2	15.6
Emery County	11,451	23.4	6.7	53.3	3,279	78.1	15.1
Garfield County	3,673	21.1	11.9	55.9	1,196	73.8	25.3
Grand County	8,241	21.4	6.6	60.1	2,759	67.9	13.0
Uintah County	20,506	24.1	6.0	55.1	5,949	75.3	13.8
Wayne County	1,911	22.0	13.6	51.4	615	79.0	27.5

[a]School-age = 5-17 years; work-age = 16-64 years; retirement-age = $\geq$65 years.

Source: U.S. Department of Commerce, *1980 Census of Population: General Population Characteristics, Utah* (1982).

Carbon County

Of the 22,179 residents of the county in 1980, 20.1% were of school age, 57.6% were of work age, and 9.7% were of retirement age. Figure 2.10 shows that there was a smaller portion of people in the 5-24 year age group than in the state as a whole, but that there was a higher portion in the 55 and over age group. The median age in the county in 1980 was 26.1. American Indians and blacks combined to make up 1% of the population in the county, with American Indians outnumbering blacks two to one. There were 7,242 households with an average of 3.06 people per household in the county in 1980. About 71% of these households had a married-couple family, and about 20% of the households had members of retirement age (Table 2.2).

Forty-one percent of the people in Carbon County in 1980 lived in Price (Fig. 2.3). Another 12% resided in Helper, while East Carbon, Wellington, Sunnyside, Hiawatha, and Scofield had less than 10% each of the population in the county. Other cities and unincorporated areas accounted for the remaining 27% of the population.

Duchesne County

Table 2.2 shows that the 12,565 residents of Duchesne County in 1980 included 25.9% of the total who were of school age, 52.5% who were of work age, and 6.8% who were of retirement age. A higher proportion of the county population than the state population was in the 14 and under age group, with a slightly lower proportion in the 25-34 and 55-64 age groups (Fig. 2.11). The median age in the county was 22.0 in 1980, the second lowest in the state.

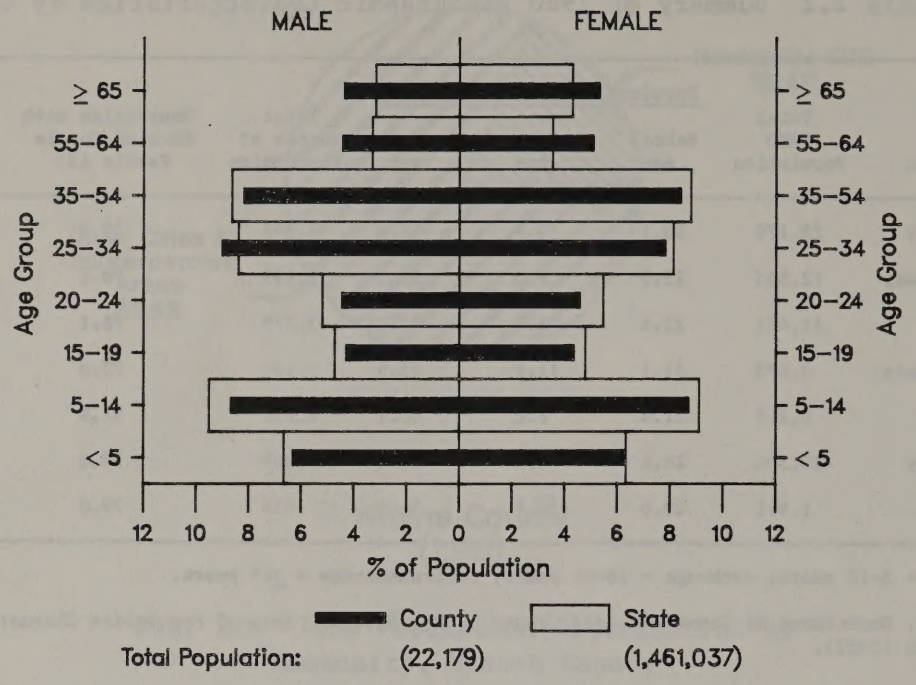

Fig. 2.10 Carbon County Population Pyramid (1980)

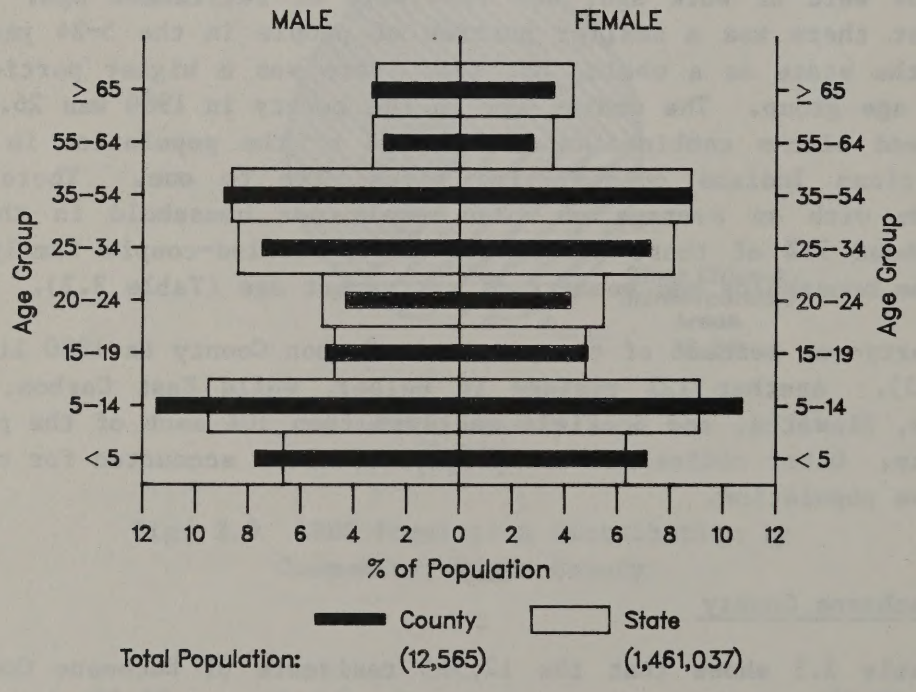

Fig. 2.11 Duchesne County Population Pyramid (1980)

Over 2% of the population was American Indian. The 3.59 average household size was among the highest in the state. Over 78% of the 3,499 households had a married-couple family, and 15.6% had a member of retirement age.

Roosevelt accounted for 30.6% of the total 1980 population in the county and Duchesne accounted for 13.3%. The other 56.1% was located in other cities and unincorporated areas (Fig. 2.4).

Emery County

Of the 11,451 residents of Emery County in 1980, 23.4% were of school age, 53.3% were of work age, and 6.7% were of retirement age (Table 2.2). The county had a significantly greater percentage of residents in the 14 and under age group than did the state as a whole, with a corresponding smaller percentage in the older age groups (Fig. 2.12). The median age of the county was 22.3, the fourth lowest in the state. Slightly over 1% of the county was American Indian. The average household size of 3.49 in 1980 was the second highest in the region. The 3,279 households in the county included 78.1% that had a married-couple family and 15.1% that had a member of retirement age.

Figure 2.5 shows that the population of Emery County was distributed among several cities. Huntington had 20.1% of the population in the county in 1980, Castle Dale had 16.5%, Ferron had 14.9%, and Orangeville had 11.3%. Green River, Cleveland, Emery, Elmo, and Clawson each had less than 10%.

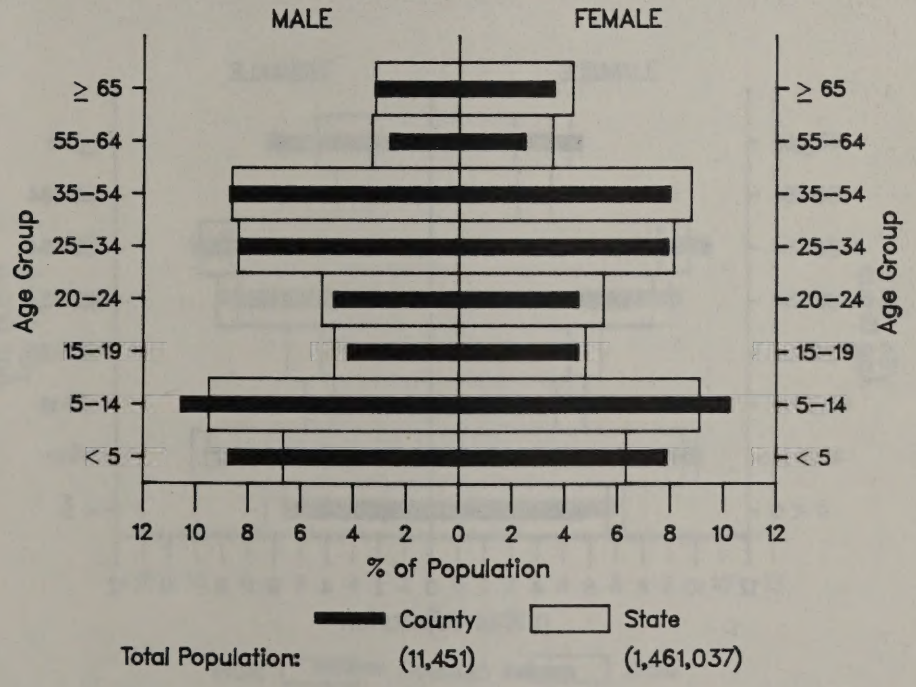

Fig. 2.12 Emery County Population Pyramid (1980)

Other cities and unincorporated areas accounted for the remaining 17.8% of the population in the county.

Garfield County

In 1980, 3,673 lived in Garfield County. This population was distributed as follows: 21.1% school age, 55.9% work age, and 11.9% retirement age (Table 2.2). The county population was considerably older than the state population, as evidenced by the high proportion in the 35 and older age group and the median age of 28.3 (Fig. 2.13). Almost 2% of the county was American Indian. The average household size in 1980 was 3.07. Almost 74% of the 1,196 households in the county had a married-couple family, and 25.3% had a member of retirement age.

Figure 2.6 shows that Escalante had 17.8% of the population in Garfield County in 1980. Boulder had 3.1% of the population. The majority of the population in the county was located in the unincorporated areas of the Hite CCD (5.5%) and in other cities and unincorporated areas (73.6%).

Grand County

Of the 2,759 residents of Grand County in 1980, 21.4% were of school age, 60.1% were of work age, and 6.6% were of retirement age (Table 2.2). The age distribution of the county was roughly similar to that of the state as a

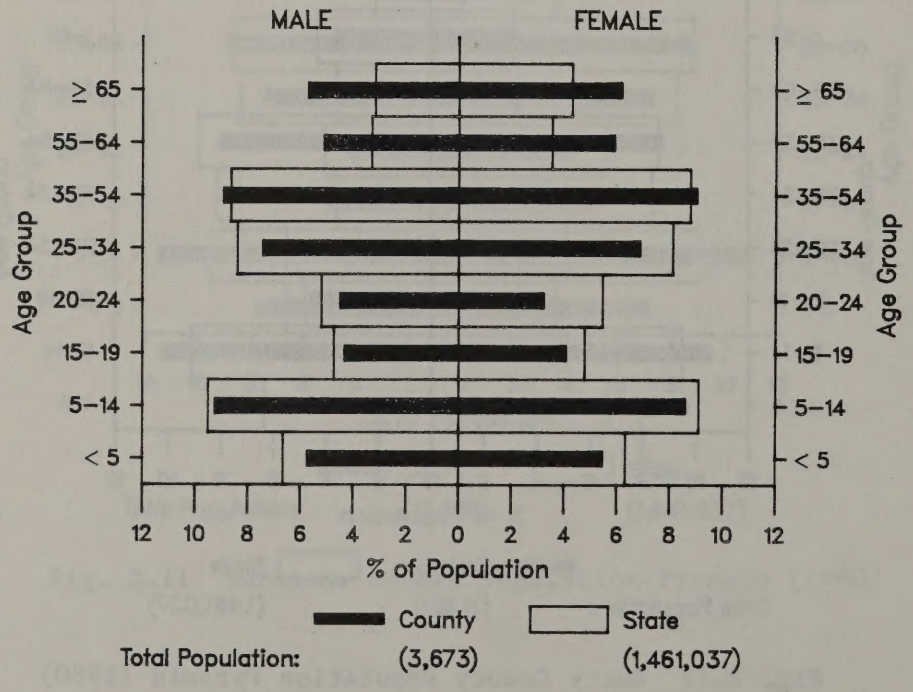

Fig. 2.13 Garfield County Population Pyramid (1980)

whole (Fig. 2.14). The median age in the county in 1980 was 25.9. American Indians accounted for almost 2% of the population in the county, while blacks accounted for well under 1%. There were 2,759 households in the county in 1980, with an average size of 2.99 — lowest in the region. Only 67.9% of the households had a married-couple family and 13.0% had a member of retirement age. Both percentages were lowest in the region.

The population of Grand County in 1980 was divided between the Thompson CCD (64.7%) and other cities and unincorporated areas (35.3%) (Fig. 2.7).

Uintah County

The 20,506 residents in Uintah County in 1980 were distributed among school age (24.1%), work age (55.1%), and retirement age (6.0%). This is shown in Table 2.2. The percentage of residents in the 14 and under age group exceeded that of the state, but the percentage in the 20-24 age group was less than that of the state (Fig. 2.15). The median age of the county in 1980 was 22.9. American Indians comprised 9.5% of the county population, highest in the region. Of the 5,949 households in the county in 1980, 75.3% had a married-couple family and 13.8% had a member of retirement age. The average household size was 3.45.

Vernal had almost one-third of the Uintah County population in 1980 (Fig. 2.8). Another 2.7% was located in Ballard. Other cities and unincorporated areas accounted for 65.1% of the population in the county.

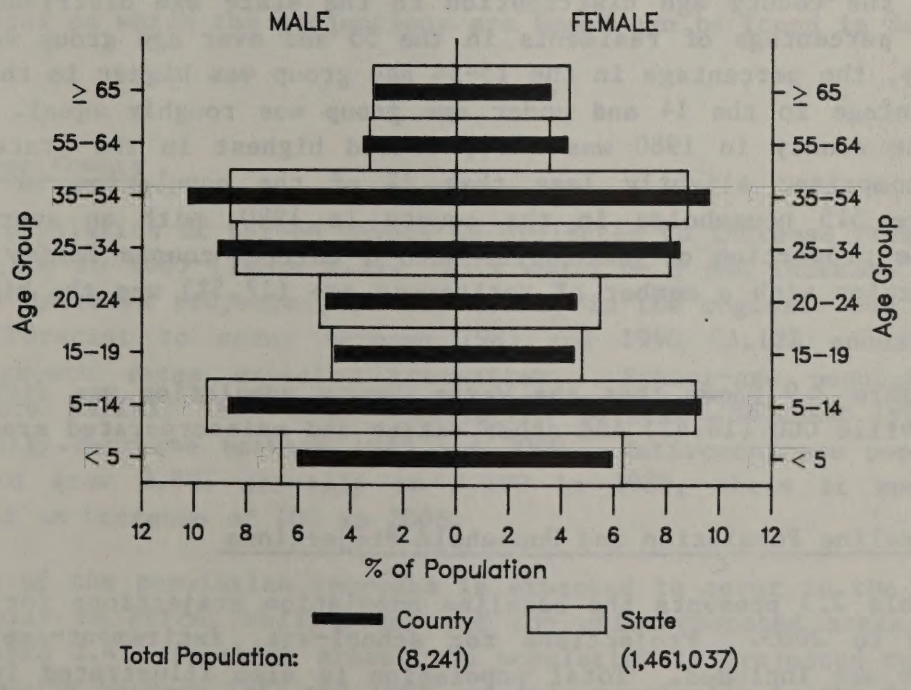

Fig. 2.14 Grand County Population Pyramid (1980)

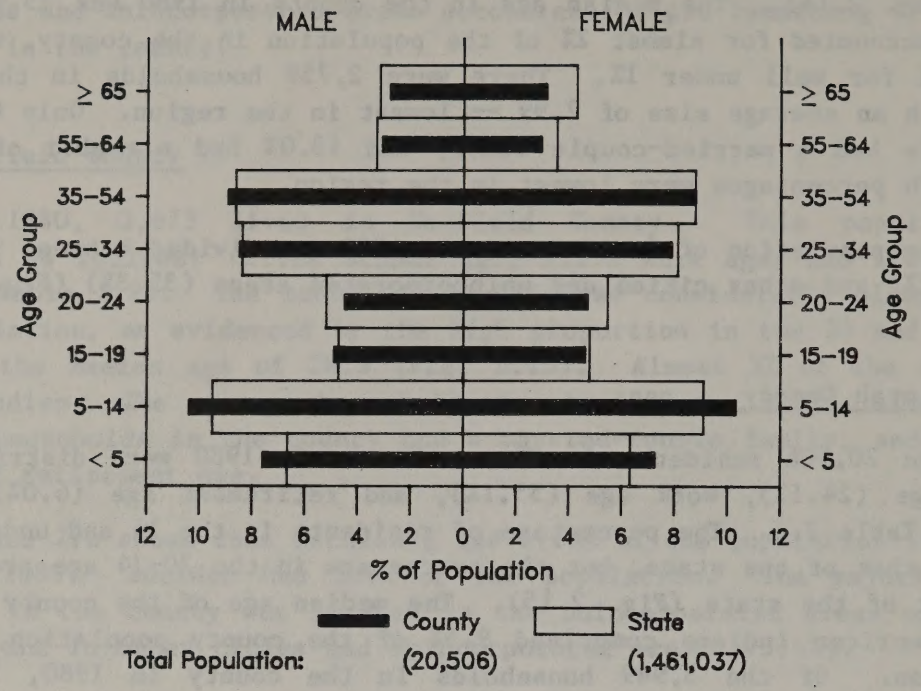

Fig. 2.15 Uintah County Population Pyramid (1980)

Wayne County

Of the 1,911 residents of Wayne County in 1980, 22.0% were of school age, 51.4% were of work age, and 13.6% were of retirement age (Table 2.2). Comparing the county age distribution to the state age distribution in Fig. 2.16, the percentage of residents in the 55 and over age group was higher in the county, the percentage in the 15-54 age group was higher in the state, and the percentage in the 14 and under age group was roughly equal. The median age of the county in 1980 was 28.4, second highest in the state. American Indians comprised slightly less than 1% of the population in the county. There were 615 households in the county in 1980, with an average size of 3.11. The proportion of households with a married-couple family (79.0%) and the proportion with a member of retirement age (27.5%) was the highest in the state.

Figure 2.9 shows that the Wayne County population was divided between the Hanksville CCD (18.4%) and other cities and unincorporated areas (81.6%).

2.2.3 Baseline Population and Household Projections

Table 2.3 presents the baseline population projections for each county from 1985 to 2005. Projections for school-age, retirement-age, and total population are included. Total population is also illustrated in Fig. 2.17. Additional detail is provided in Table 2.4, which shows baseline population projections for the cities and unincorporated areas within each CCD and

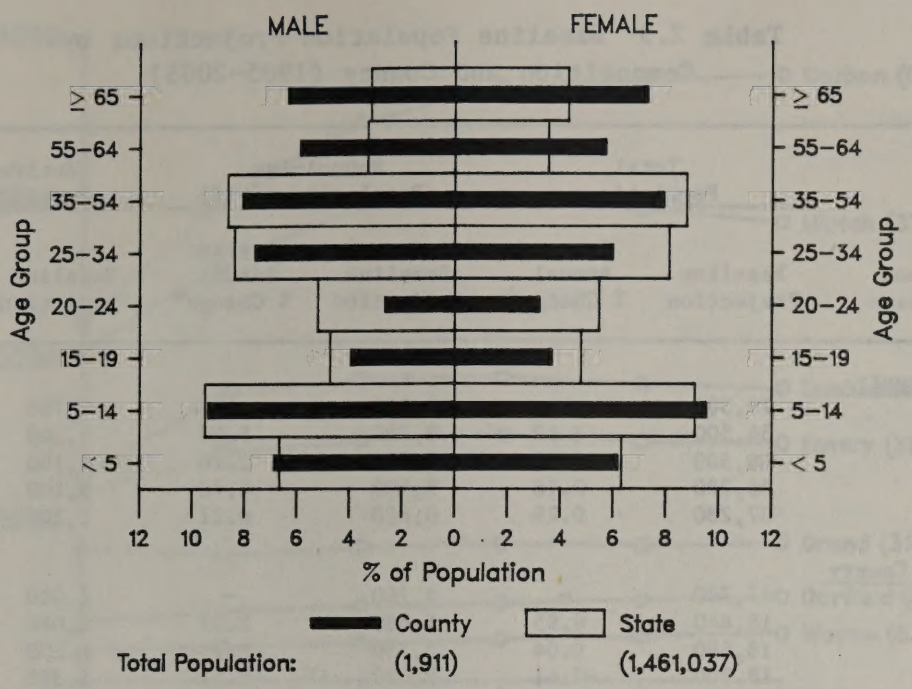

Fig. 2.16 Wayne County Population Pyramid (1980)

county. The baseline projections for households are presented in Table 2.5 by county and community.

The baseline population projections were determined by the state of Utah using the UPED model. An explanation of the methods, major assumptions, and conditions on which the projections are based can be found in Sec. 1.4 and Appendix A.

Carbon County

The population of Carbon County is projected to increase from 29,590 in 1985 to 37,280 in 2005 (Table 2.3). This would be a 68% increase from 1980, the largest increase projected for any county in the region. The most rapid growth is forecast to occur between 1985 and 1990 (3.12% annually), with declining growth rates expected thereafter. School-age population would increase more rapidly than total population between 1985 and 1995, but it would actually decrease between 1995 and 2000. Retirement-age population is projected to grow 2.80% annually to 3,100 in 1985, where it would remain steady until an increase of 100 in 2005.

Most of the population increase is expected to occur in the Price CCD, and especially in Price, Wellington, and the unincorporated areas. This is shown in Table 2.4. In these areas, the population is projected to grow from 2 to 3% annually between 1985 and 1995 and only marginally in the following 10 years. Growth in the Helper CCD would be about 1.4% annually between 1985 and

Table 2.3 Baseline Population Projections by Composition and County (1985-2005)

County and Window Years	Total Population		School-Age Population (5-17)		Retirement-Age Population (≥65)	
	Baseline Projection	Average Annual % Change[a]	Baseline Projection	Average Annual % Change[a]	Baseline Projection	Average Annual % Change[a]
Carbon County						
1985	29,590	-	6,800	-	2,700	-
1990	34,500	3.12	8,700	5.05	3,100	2.80
1995	36,500	1.13	9,700	2.20	3,100	0
2000	36,790	0.16	9,500	-0.42	3,100	0
2005	37,280	0.26	9,600	0.21	3,200	0.64
Duchesne County						
1985	17,780	-	4,760	-	1,000	-
1990	18,640	0.95	5,430	2.67	1,080	1.55
1995	18,680	0.04	5,750	1.15	1,200	2.13
2000	18,300	-0.41	5,330	-1.51	1,300	1.61
2005	17,970	-0.36	5,230	-0.38	1,440	2.07
Emery County						
1985	14,060	-	3,800	-	900	-
1990	14,840	1.09	4,400	2.98	910	0.22
1995	15,080	0.32	4,700	1.33	900	-0.22
2000	14,730	-0.47	4,500	-0.87	870	-0.68
2005	14,550	-0.25	4,500	0	860	-0.23
Garfield County						
1985	4,300	-	1,000	-	500	-
1990	4,600	1.36	1,200	3.71	500	0
1995	4,800	0.85	1,300	1.61	490	-0.40
2000	4,990	0.77	1,400	1.49	460	-1.30
2005	5,210	0.87	1,500	1.39	480	0.85
Grand County						
1985	7,800	-	2,050	-	580	-
1990	8,250	1.13	2,430	3.46	590	0.34
1995	8,460	0.50	2,550	0.97	590	0
2000	8,330	-0.31	2,430	-0.96	570	-0.69
2005	8,500	0.40	2,480	0.41	580	0.35
Uintah County						
1985	25,720	-	6,820	-	1,450	-
1990	29,310	2.58	8,430	4.33	1,710	3.35
1995	29,850	0.37	9,190	1.74	1,920	2.34
2000	28,970	-0.60	8,440	-1.69	2,080	1.61
2005	28,200	-0.54	8,210	-0.55	2,256	1.64
Wayne County						
1985	2,130	-	510	-	290	-
1990	2,340	1.90	560	1.89	320	1.99
1995	2,570	1.89	620	2.06	350	1.81
2000	2,740	1.29	660	1.26	370	1.12
2005	2,930	1.35	700	1.18	400	1.57

[a]Computed as an average annual compound percent change from previous window year.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

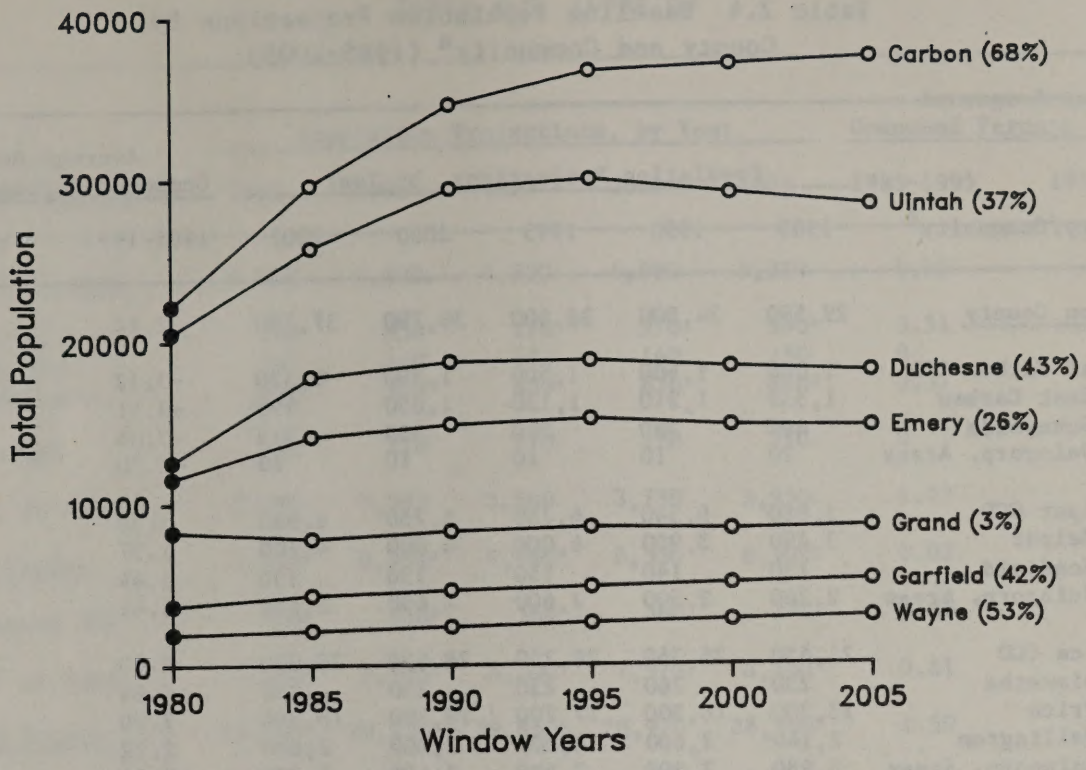

Fig. 2.17 Baseline Population Projections by County, 1980-2005 (1980-2005 percent change in parentheses)

1995 and 0.25% annually or less between 1995 and 2005. Helper, Scofield, and the unincorporated areas would each follow the growth pattern of the CCD as a whole. Population in the East Carbon CCD is projected to decline throughout the period. In the unincorporated areas, the drop would be as high as 6.70% annually between 1985 and 1995.

The number of households in Carbon County is expected to increase from 9,460 in 1985 to 11,700 in 2005. Most of this growth (1.79% annually) will take place during the first 10 years with less growth (0.35% annually) in the next 10 years. This growth pattern is illustrated in Table 2.5. In the Price CCD and the Helper CCD, the increase in households would be less than population growth between 1985 and 1995 and greater than population growth between 1995 and 2005. Household growth is projected to be 2.37% annually between 1985 and 1995 in the Price CCD, and would range from 1.34% annually in Hiawatha to 2.56% annually in Price. The increase would be about half as great in the Helper CCD as in the Price CCD between 1985 and 1995, but both CCDs and the towns therein are forecast to increase about 0.4% annually between 1995 and 2005. The number of households in the East Carbon CCD would decrease 3.69% annually from 1985 to 1995 and 1.14% annually from 1995 to 2005.

Table 2.4 Baseline Population Projections by County and Community[a] (1985-2005)

County/Community[b]	Population Projections, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County	29,590	34,500	36,500	36,790	37,280	2.12	0.21
East Carbon CCD	2,060	1,600	1,500	1,390	1,320	-3.12	-1.27
East Carbon	1,550	1,210	1,130	1,050	995	-3.11	-1.26
Sunnyside	490	380	360	330	315	-3.04	-1.33
Unincorp. Areas	20	10	10	10	10	-6.70	0
Helper CCD	5,880	6,540	6,750	6,750	6,910	1.39	0.23
Helper	3,490	3,900	4,000	4,000	4,100	1.37	0.25
Scofield	130	140	150	150	150	1.44	0
Unincorp. Areas	2,260	2,500	2,600	2,600	2,660	1.41	0.23
Price CCD	21,650	26,360	28,250	28,650	29,050	2.70	0.28
Hiawatha	230	260	250	250	250	0.84	0
Price	13,300	16,300	17,700	18,200	18,500	2.90	0.44
Wellington	2,140	2,600	2,800	2,800	2,800	2.72	0
Unincorp. Areas	5,980	7,200	7,500	7,400	7,500	2.29	0
Duchesne County	17,780	18,640	18,680	18,300	17,970	0.50	-0.39
Duchesne CCD	4,080	3,580	3,680	3,660	3,590	-1.03	-0.25
Duchesne City	2,420	2,120	2,180	2,170	2,130	-1.04	-0.23
Rest of CCD	1,660	1,460	1,500	1,490	1,460	-1.01	-0.27
Roosevelt CCD	13,700	15,060	15,000	14,640	14,380	0.91	-0.42
Altamont	270	300	300	290	290	1.06	-0.34
Myton	710	780	770	750	740	0.81	-0.40
Roosevelt	5,420	5,960	5,930	5,790	5,690	0.90	-0.41
Rest of CCD	7,300	8,020	8,000	7,810	7,660	0.92	-0.43
Emery County	14,060	14,840	15,080	14,730	14,550	0.70	-0.36
Castle Dale-Huntington CCD	9,770	10,490	10,600	10,380	10,200	0.82	-0.38
Castle Dale	2,650	2,900	3,000	2,900	2,850	1.25	-0.51
Cleveland	580	610	620	610	600	0.67	-0.33
Elmo	350	380	380	370	360	0.83	-0.54
Huntington	2,850	3,000	3,000	2,900	2,850	0.51	-0.51
Orangeville	1,870	2,000	2,000	2,000	1,970	0.67	-0.15
Unincorp. Areas	1,470	1,600	1,600	1,600	1,570	0.85	-0.19
Emery-Ferron CCD	3,280	3,210	3,310	3,180	3,180	0.10	-0.40
Clawson	270	260	260	250	250	-0.38	-0.39
Emery	480	480	490	480	480	0.21	-0.21
Ferron	2,250	2,200	2,300	2,200	2,200	0.22	-0.44
Unincorp. Areas	280	270	260	250	250	-0.74	-0.39
Green River CCD	1,010	1,140	1,170	1,170	1,170	1.48	0
Green River	870	980	1,000	1,000	1,000	1.40	0
Unincorp. Areas	140	160	170	170	170	1.96	0

Table 2.4 (Cont'd)

County/Community[b]	Population Projections, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Garfield County	4,300	4,600	4,800	4,990	5,210	1.10	0.82
Escalante CCD	940	950	970	970	990	0.31	0.20
Boulder	140	140	140	140	150	0	0.69
Escalante	800	810	830	830	840	0.37	0.12
Hite CCD	270	270	270	270	270	0	0
Rest of County	3,090	3,380	3,560	3,750	3,950	1.43	1.04
Grand County	7,800	8,250	8,460	8,330	8,500	0.82	0.05
Thompson CCD	330	350	360	360	370	0.87	0.27
Rest of County	7,470	7,900	8,100	7,970	8,130	0.81	0.04
Uintah County	25,720	29,310	29,850	28,970	28,200	1.50	-0.57
Uintah Ouray CCD	5,070	5,700	5,730	5,570	5,420	1.23	-0.55
Ballard	780	970	980	930	900	2.31	-0.85
Rest of CCD	4,290	4,730	4,750	4,640	4,520	1.02	-0.50
Vernal CCD	20,650	23,610	24,120	23,400	22,780	1.57	-0.57
Naples	3,030	3,460	3,540	3,430	3,340	1.57	-0.58
Vernal	9,290	11,070	11,370	10,940	10,650	2.04	-0.65
Rest of CCD	8,330	9,080	9,210	9,030	8,790	1.01	-0.47
Wayne County	2,130	2,340	2,570	2,740	2,930	1.90	1.32
Hanksville CCD	340	430	480	520	570	3.51	1.73
Rest of County	1,790	1,910	2,090	2,220	2,360	1.56	1.22

[a]Totals may not add due to rounding.

[b]Census County Division (CCD).

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 2.5 Baseline Household Projections by County and Community[a] (1985-2005)

County/Community[b]	Household Projections, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County	9,460	10,850	11,300	11,520	11,700	1.79	0.35
East Carbon CCD	670	500	460	430	410	-3.69	-1.14
East Carbon	500	380	350	330	310	-3.50	-1.21
Sunnyside	160	120	110	100	100	-3.68	-0.95
Unincorp. Areas	5	4	3	3	3	-4.98	0
Helper CCD	1,880	2,060	2,110	2,130	2,170	1.16	0.28
Helper	1,110	1,220	1,250	1,260	1,280	1.19	0.23
Scofield	40	40	50	50	50	2.26	0
Unincorp. Areas	730	800	810	820	840	1.05	0.36
Price CCD	6,910	8,290	8,730	8,960	9,120	2.37	0.43
Hiawatha	70	80	80	80	80	1.34	0
Price	4,250	5,130	5,470	5,690	5,790	2.56	0.57
Wellington	680	820	860	880	900	2.38	0.46
Unincorp. Areas	1,910	2,260	2,320	2,310	2,350	1.96	0.13
Duchesne County	5,260	5,370	5,340	5,400	5,480	0.15	0.26
Duchesne CCD	1,210	1,030	1,050	1,080	1,100	-1.41	0.47
Duchesne City	720	610	620	640	650	-1.48	0.47
Rest of CCD	490	420	430	440	450	-1.30	0.46
Roosevelt CCD	4,050	4,350	4,290	4,320	4,380	0.58	0.21
Altamont	60	80	80	80	80	2.92	0
Myton	200	210	210	210	210	0.49	0
Roosevelt	1,600	1,720	1,700	1,710	1,730	0.61	0.18
Rest of CCD	2,190	2,330	2,300	2,320	2,360	0.49	0.26
Emery County	3,920	4,030	4,070	4,030	3,970	0.38	-0.25
Castle Dale-Huntington CCD	2,720	2,850	2,860	2,830	2,780	0.50	-0.28
Castle Dale	730	790	800	790	780	0.92	-0.25
Cleveland	160	170	170	170	160	0.61	-0.60
Elmo	100	100	100	100	100	0	0
Huntington	790	810	800	790	780	0.13	-0.25
Orangeville	520	540	550	540	530	0.56	-0.37
Unincorp. Areas	420	440	440	440	430	0.47	-0.23
Emery-Ferron CCD	930	870	880	870	870	-0.55	-0.11
Clawson	80	70	70	70	70	-1.33	0
Emery	140	130	130	130	130	-0.74	0
Ferron	630	600	610	600	600	-0.32	-0.17
Unincorp. Areas	80	70	70	70	70	-1.33	0
Green River CCD	270	310	330	330	320	2.03	-0.31
Green River	230	270	280	280	270	1.99	-0.36
Unincorp. Areas	40	40	50	50	50	2.26	0

Table 2.5 (Cont'd)

County/Community[b]	Household Projections, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Garfield County	1,440	1,540	1,610	1,670	1,740	1.12	0.78
Escalante CCD	320	320	330	330	330	0.31	0
Boulder	50	50	50	50	50	0	0
Escalante	270	270	280	280	280	0.36	0
Hite CCD	90	90	90	90	90	0	0
Rest of County	1,030	1,130	1,190	1,250	1,320	1.45	1.04
Grand County	2,600	2,790	2,850	2,790	2,870	0.92	0.07
Thompson CCD	110	120	120	120	130	0.87	0.80
Rest of County	2,490	2,670	2,730	2,670	2,740	0.92	0.04
Uintah County	7,620	8,450	8,530	8,540	8,610	1.13	0.09
Uintah Ouray CCD	1,500	1,640	1,640	1,640	1,660	0.90	0.12
Ballard	230	280	280	270	280	1.99	0
Rest of CCD	1,270	1,360	1,360	1,370	1,380	0.69	0.14
Vernal CCD	6,120	6,810	6,890	6,900	6,950	1.19	0.09
Naples	900	1,000	1,010	1,010	1,020	1.16	0.10
Vernal	2,750	3,190	3,250	3,230	3,250	1.68	0
Rest of CCD	2,470	2,620	2,630	2,660	2,680	0.63	0.19
Wayne County	680	750	820	890	940	1.89	1.38
Hanksville CCD	120	140	150	170	180	2.26	1.84
Rest of County	560	610	670	720	760	1.81	1.27

[a]Totals may not add due to rounding.

[b]Census County Division (CCD).

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Duchesne County

The population of Duchesne County would increase 43% between 1980 and 2005, reaching a total of 17,970 in 2005. All of this growth, as shown in Table 2.3, is projected to occur by 1995; the population of the county is expected to decline 0.39% annually after 1995. The school-age population would increase more rapidly than total population between 1985 and 1995, but it would decrease more rapidly than total population from 1995 to 2005. Alternatively, the retirement-age population is forecast to increase throughout the 20-year period by 1.55% to 2.13% annually.

The Roosevelt CCD is projected to grow 0.91% annually between 1985 and 1995, but the smaller Duchesne CCD would actually decrease 1.03% annually during the same period (Table 2.4). In 1995 through 2005, the population of each CCD would decrease by less than half of a percent annually. The cities of Duchesne and Roosevelt, as well as the other areas of the county, are expected to follow the pattern of their respective CCDs.

Household growth would be less than population growth in Duchesne County between 1985 and 1995. This is illustrated in Table 2.5. The Roosevelt CCD is projected to increase 0.58% annually while the Duchesne CCD would decrease 1.41% annually through 1995. But unlike the decrease in county population that is projected after 1995, the number of households would increase in both the Roosevelt CCD (0.21% annually) and the Duchesne CCD (0.47% annually). Again, the cities of Duchesne and Roosevelt and the other areas of the county are expected to follow the pattern of their respective CCDs.

Emery County

Table 2.2 indicates that the Emery County population would increase from 14,060 in 1985 to 14,550 in 2005. Most of the 27% increase between 1985 and 2005 is projected to take place by 1990. The population of the county is expected to reach a peak of 15,080 in 1995 and would decline by 0.36% annually after 1995. School-age population would grow more rapidly than the total population through 1995, at which time it would drop 0.87% annually in the next five years and remain constant through 2005. After an increase of 10 people between 1985 and 1990, retirement-age population is forecast to decrease to 860 in 2005.

The most rapid growth in population is projected to occur in the Green River CCD (Table 2.4). The city of Green River would grow 1.40% annually between 1985 and 1995, and the unincorporated areas would increase 1.96% annually during the same period. The population of the Green River CCD is projected to remain constant from 1995 until 2005. The Castle Dale-Huntington CCD would grow somewhat more rapidly than the Emery-Ferron CCD through 1995, although neither CCD would grow by more than 1% annually. There is projected to be considerable variation in the population changes in the cities of these

two CCDs between 1985 and 1995; the difference would range from a 1.25% annual increase in Castle Dale to a 0.74% decline in the unincorporated areas of the Emery-Ferron CCD. The populations of the Castle Dale-Huntington CCD and the Emery-Ferron CCD are forecast to have annual decreases of 0.38% and 0.40%, respectively, after 1995, with little variation expected among the cities.

The number of households in Emery County is projected to change only slightly, from 3,920 in 1985 to 3,970 in 2005 (Table 2.5). A peak of 4,070 households would be reached in 1995. This would be followed by a 0.25% annual decrease. The change in the number of households would reflect the projected change in population in each CCD, with the exception of the 0.55% annual decrease in households expected in the Emery-Ferron CCD from 1985 to 1995.

Garfield County

The population of Garfield County is forecast to increase 42% between 1980 and 2005, reaching a total of 5,210 in 2005 (Table 2.3). The greatest increase would occur between 1985 and 1995 -- 1.10% annually — but the county would continue to grow 0.82% annually from 1995 to 2005. The school-age population is projected to increase throughout the period, growing from 1,000 in 1985 to 1,500 in 2005. However, the retirement-age population would fall between 1990 and 2000, but would then increase 0.85% annually from 2000 to 2005.

As shown in Table 2.4, the population of the Escalante CCD would increase by 30 between 1985 and 1995 and by 20 between 1995 and 2005. With the exception of an additional 10 people in Boulder in 2005, all of this growth would take place in Escalante. There is forecast to be no change in population in the Hite CCD between 1985 and 2005. Most of the growth would occur in other parts of the county, where the population would increase 1.43% annually from 1985 to 1995 and 1.04% annually from 1995 to 2005.

The number of households in Garfield County is projected to increase from 1,440 in 1985 to 1,740 in 2005 (Table 2.5). There would be little difference between the rate of increase in population and the rate of increase in households, even on the community level. There would also be no change in the number of households in the Hite CCD, less than a 1% annual change in Boulder, Escalante, and the Escalante CCD, and greater than a 1% annual change in the rest of the county.

Grand County

The population of Grand County is forecast to increase by only 3.14% between 1980 and 2005. After a drop between 1980 and 1985, the population would grow 0.82% annually from 1985 to 1995 and 0.05% annually from 1995 to 2005. The school-age population is expected to grow more rapidly than the county as a whole; it would increase 3.46% annually between 1985 and 1990 and

then would fluctuate for the remaining years until 2005. The retirement-age population would be 580 in 1985, and then would fluctuate until 2005 when the level would again reach 580 (Table 2.2).

The Thompson CCD is projected to grow more rapidly than the rest of the county: 0.87% annually vs. 0.81% annually from 1985 to 1995, and 0.27% annually vs. 0.04% annually from 1995 to 2005 (see Table 2.4). But since the Thompson CCD would account for only 330 of the 7,800 people in the county in 1985 (4.2%), the additional 40 people in the Thompson CCD in 2005 would be insignificant in comparison to the 660 additional people projected for the rest of the county in 2005.

The number of households in Grand County are projected to increase from 2,600 in 1985 to 2,870 in 2005. The change in the number of households, shown in Table 2.5, would closely reflect the projected change in the population. One difference would be that the Thompson CCD is expected to grow slightly less rapidly than the rest of the county between 1985 and 1995. In both the Thompson CCD and the other areas of the county there would be 10 more households in 2005 than there were in 1995.

Uintah County

The population of Uintah County is forecast to increase from 25,720 in 1985 to 28,200 in 2005. The county would grow 1.50% annually from 1985 to 1995, but would then decrease 0.57% annually from 1995 to 2005 (Table 2.4). Similarly, school-age population would jump from 6,820 in 1985 to 9,190 in 1995 and then would decline 10.7% in the following 10 years. Retirement-age population is projected to increase at rates that would range from 1.61% annually to 3.35% annually between 1985 and 2005.

The Vernal CCD would grow 1.57% annually from 1985 to 1995. Similarly, Naples would grow at the same rate as the CCD as a whole, Vernal would grow over 2% annually, and the rest of the county would grow at a 1% annual rate. The population of the Uintah Ouray CCD is projected to increase at a slightly slower rate between 1985 and 1995: 1.23% annually. Ballard would grow 2.31% annually, while the rest of the county would grow 1.02% annually. In the 1995 to 2005 period, both CCDs are expected to lose over 0.5% of their populations. There would be a small variation in the rate of decrease among the cities and other areas of the county.

The number of households in Uintah County is projected to increase from 7,620 in 1985 to 8,610 in 2005 (Table 2.5). Most of this growth would occur during the 1985 to 1995 period. The Vernal and Uintah Ouray CCDs are expected to increase at annual rates of 1.19% and 0.90%, respectively. The number of households would increase most rapidly in Ballard. Unlike the projected decrease in population, the number of households in the county would continue to grow after 1995. In no part of the county, however, would this growth be greater than 0.20% annually.

Wayne County

Between 1980 and 2005, the population of Wayne County is forecast to increase by slightly over 50%. This growth would be roughly continuous throughout the period, reaching 2,930 in 2005 (Table 2.3). The number of school-age children and the retirement-age population would grow at annual rates that range from 1.12% to 2.06% between 1985 and 2005.

The most rapid population growth in the county would occur in the Hanksville CCD, which would grow 3.51% annually from 1985 to 1995 and 1.73% annually from 1995 to 2005. Even by 2005, however, the Hanksville CCD would comprise only a quarter of the population in the county. The rest of the county is projected to increase at a slightly slower rate between 1985 and 2005 (Table 2.4).

The number of households in Wayne County is forecast to increase from 680 in 1985 to 940 in 2005 (Table 2.5). In the county as a whole, the rate of growth in households would be similar to the rate of population growth. But the number of households in the Hanksville CCD would increase at a slower rate than population, while the number of households in the rest of the county would increase at a rate greater than the rate of increase in population.

2.3 ECONOMIC BASE, EMPLOYMENT, AND INCOME TRENDS

The primary economic activities in each county are described in this subsection. A profile of the historic and current economic base of each county, the employment trends in each county since 1970, and the baseline employment projections are used to explain the economy of the region (Secs. 2.3.1 and 2.3.2). The final area of the economy addressed in this section is wages and income. A discussion of the average monthly wages and personal income — historical and projected — is presented in Sec. 2.3.3.

2.3.1 Economic Profile of Tar Sands Development Areas

A narrative description of the economic history of each county and community is presented here. The proportion of industrial sectors that would potentially support future energy developments is also included. Sectoral information for mining, contract construction, and manufacturing in 1981 was drawn from recent U.S. Census material. The number of workers in each county in 1981 does not include government employees, railroad employees, and self-employed persons.

Carbon County

Traditionally, Carbon County has relied heavily on the extensive coal industry in the area. The county is well acquainted with the boom and bust

cycle of energy development. Price has been the coal capitol of Utah since the nineteenth century. The number of working mines near Price has fluctuated from 22 in 1910 to 69 in 1949. Most of the coal has been shipped by railroad to steel smelting plants on the West Coast. East Carbon, Hiawatha, and Sunnyside all developed as company towns for the coal industry. Helper is also a coal town, but it is somewhat of a regional center and has a more diversified economy. Scofield is an old coal mining community that threatened to become a ghost town several years ago. Wellington, unlike the rest of the county, is a farming, trade, and residential center.

Of the 6,040 workers in Carbon County in 1981, 52% were in mining, contract construction, or manufacturing. Sixty-one of the 438 business establishments in the county in 1981 were in those three sectors. Mining establishments were commonly the largest in the county.

Duchesne County

Duchesne County has benefited greatly from the recent development of the oil industry in the area. The combination of working oil production facilities, support services for the industry, and the anticipation of further growth has spurred the economy of the county. Roosevelt has been the recipient of much of this growth. It is also the commercial center of the county and the main commercial center for members of the Ute tribe. The city of Duchesne has been excluded from much of the oil production activity. Instead, Duchesne has relied on water projects undertaken by the Bureau of Reclamation.

Of the 2,866 workers in Duchesne County in 1981, 41% were employed in either mining, contract construction, or manufacturing. Seventy-five of the 276 business establishments were in one of these three sectors.

Emery County

Coal and agriculture have long been the economic base of Emery County. The construction of the Castle Dale Power Complex and the Huntington Canyon Power Complex by the Utah Power and Light Company during the 1970s transformed many of the communities in the area. Originally quiet agriculture towns, Huntington, Castle Dale, Orangeville, and Ferron have been greatly affected by the increased mining and production of electricity. Cleveland, Elmo, and Emery have been changed to a lesser degree. Green River, located on Interstate Highway 70 in the eastern part of the county, has become increasingly dependent on the considerable tourist trade in the area.

Of the 3,695 workers in Emery County in 1981, 2,098 were in mining, between 500 and 1000 were in contract construction, and between 20 and 100 were in manufacturing. Therefore, the majority of the work force is currently employed in one of the three critical growth sectors. The 143 business

establishments in the county in 1981 included six mining establishments, 13 contract construction establishments, and two manufacturing establishments. There was one mining establishment with more than 1,000 employees and one contract construction establishment with between 500 and 1,000 employees.

Garfield County

Garfield County has retained a diversified, if not extensive, economic base. Escalante has traditionally relied on farming, stock raising, and lumbering for economic support. In recent years these activities have been supplemented by tourism, some oil production, and government employment. Boulder continues to rely chiefly on agriculture. Both towns were long isolated from the rest of the state. Water limitations and the rugged nature of the land itself tend to thwart potential development.

Of the 471 workers in Garfield County in 1981, fewer than 20 were in mining, 38 were in contract construction, and 195 were in manufacturing. Twenty-two percent of the business establishments in the county were in one of these three sectors. Manufacturing establishments were among the largest in the county.

Grand County

The uranium boom of the 1950s is still the dominant feature of Grand County. The county has grown little before or since and is greatly affected by shifts in the uranium industry. Moab is the commercial center of the area. Mining, agriculture, and tourism maintain considerable importance in the city. The proximity of Canyonlands and Arches National Parks is responsible for the strong tourism industry. Much of the surrounding area is desolate and void of any economic activity or settlement.

Of the 1,997 workers in Grand County in 1981, 34% were in either mining, contract construction, or manufacturing. Fifty-four of the 227 business establishments in the county in 1981 were in one of these three sectors. Mining establishments were the largest in the county.

Uintah County

The development of the oil industry, and the expected development of other energy sources, has stimulated extensive growth in Uintah County in recent years. A primary beneficiary of this growth has been Vernal, the regional center of northeastern Utah. Once important, agriculture has become of secondary concern to the city. Numerous energy interests have facilities located in Vernal. Ballard and Naples are dependent upon the general growth of the area and have no economic base of their own.

Of the 5,604 workers in Uintah County in 1981, 34% were in either mining, contract construction, or manufacturing. One-fourth of the 52 business establishments in the county in 1981 were in one of these three sectors.

Wayne County

Wayne County is one of the poorest counties in Utah. Agriculture has been the dominant economic activity in the area. Except for some tourism and lumbering, all other economic activity has been delegated to Richfield, located northwest of the county. Hanksville has long been one of the most isolated communities in Utah. Even with increasing tourism and the portent of energy development, Hanksville remains a traditional agricultural community.

The 182 workers in Wayne County in 1981 included less than 20 in contract construction, less than 20 in manufacturing, and none in mining. There were three contract construction establishments and one manufacturing establishment among the 30 business establishments in the county in 1981.

2.3.2 Employment Patterns: Historical and Projected

Total and sectoral employment patterns are described in Sec. 2.3.2.1, while the future employment trends are addressed in Sec. 2.3.2.2.

2.3.2.1 Employment Sector History

Table 2.6 shows the historical county employment levels by industrial sector for 1970, 1975, and 1980. The annual employment data by county between 1970 and 1980 is presented in Appendix C, Tables C.1 through C.7.

Carbon County

Total employment in Carbon County increased from 5,390 in 1970 to 9,385 in 1980. Growth in the number of employed workers was more than twice as rapid between 1975 and 1980 than between 1970 and 1975. Employment in the finance, insurance, and real estate sector increased most rapidly between 1970 and 1975, while employment in the services sector increased most rapidly between 1975 and 1980. The number of workers in the mining, contract construction, and manufacturing sector grew 126% between 1970 and 1980. Mining was the largest sector in 1980, followed by government and wholesale and retail trade.

Table 2.6 Historical County Employment Levels by Industrial Sector (1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year			Average Annual Compound Percent Change		Sectoral Employment, by Year			Average Annual Compound Percent Change	
	1970	1975	1980	1970-1975	1975-1980	1970	1975	1980	1970-1975	1975-1980
	Carbon County					Duchesne County				
Agriculture	249	214	226	-2.98	1.10	797	741	733	-1.45	-0.22
Mining	987	1,350	2,325	6.46	11.49	269	1,060	1,071	31.56	0.21
Contract Construction	128	220	338	5.57	8.97	NA	158	210	-[c]	5.86
Manufacturing	187	276	281	8.10	0.36	52	93	174	12.33	13.35
Transportation, Communication, and Utilities	460	455	650	-0.22	7.39	85	169	238	14.73	7.09
Wholesale and Retail Trade	922	1,190	1,762	5.24	8.17	299	815	893	22.21	1.84
Finance, Insurance, and Real Estate	135	277	242	15.46	-2.67	NA	80	81	-[c]	0.25
Services	464	567	1,083	4.09	13.82	211	228	298	1.56	5.50
Government	1,388	1,408	1,828	0.29	5.36	571	792	1,097	6.76	6.73
Nonfarm Proprietors	470	508	650	1.57	5.05	249	564	837	17.76	8.22
Total	5,390	6,465	9,385	3.70	7.74	2,656	4,700	5,632	12.09	3.68
	Emery County					Garfield County				
Agriculture	452	468	464	0.70	-0.17	281	237	236	-3.35	-0.08
Mining	366	1,061	2,105	23.72	14.69	NA	39	210	-[c]	40.03
Contract Construction	NA	587	522	-[c]	-2.32	34	24	379	-6.73	73.65
Manufacturing	NA	NA	22	-[c]	-[c]	204	217	248	1.24	2.71
Transportation, Communication, and Utilities	34	152	513	34.92	27.54	46	49	85	1.27	11.65
Wholesale and Retail Trade	161	245	335	8.76	6.46	127	154	125	3.93	-4.09
Finance, Insurance, and Real Estate	NA	NA	65	-[c]	-[c]	NA	15	16	-[c]	1.30
Services	63	205	225	26.61	1.88	220	278	266	4.79	-0.88
Government	370	350	716	-1.11	15.39	330	346	457	0.95	5.72
Nonfarm Proprietors	204	233	485	2.69	15.79	166	130	157	-4.77	3.85
Total	1,825	3,326	5,452	12.75	10.39	1,431	1,489	2,179	0.80	7.91

Table 2.6 (Cont'd)

Industry Sector	Sectoral Employment, by Year			Average Annual Compound Percent Change		Sectoral Employment, by Year			Average Annual Compound Percent Change	
	1970	1975	1980	1970-1975	1975-1980	1970	1975	1980	1970-1975	1975-1980
	Grand County					Uintah County				
Agriculture	70	79	75	2.45	-1.03	751	622	635	-3.70	0.41
Mining	499	423	736	-3.25	11.71	711	1,064	1,607	8.40	8.60
Contract Construction	163	206	345	4.79	10.86	180	287	270	9.78	-1.21
Manufacturing	81	83	69	0.49	-3.63	249	287	181	2.88	-8.81
Transportation, Communication, and Utilities	186	224	245	3.79	1.81	177	503	611	23.23	3.97
Wholesale and Retail Trade	401	607	809	8.64	5.91	711	1,176	1,408	10.59	3.67
Finance, Insurance, and Real Estate	53	59	88	2.17	8.32	74	107	156	7.65	7.83
Services	343	368	401	1.42	1.73	548	1,066	1,459	14.23	6.48
Government	439	420	579	-0.88	6.63	860	993	1,152	2.92	3.02
Nonfarm Proprietors	238	270	349	2.56	5.27	342	617	674	12.53	1.78
Total	2,473	2,739	3,696	2.06	6.18	4,603	6,722	8,153	7.87	3.94
	Wayne County									
Agriculture	205	195	191	-1.00	-0.41					
Mining	NA	NA	9	-[c]	-[c]					
Contract Construction	NA	NA	84	-[c]	-[c]					
Manufacturing	NA	NA	37	-[c]	-[c]					
Transportation, Communication, and Utilities	NA	NA	3	-[c]	-[c]					
Wholesale and Retail Trade	37	39	42	1.06	1.49					
Finance, Insurance, and Real Estate	NA	NA	12	-[c]	-[c]					
Services	31	NA	31	-[c]	-[c]					
Government	174	211	207	3.93	-0.38					
Nonfarm Proprietors	89	114	152	5.08	5.92					
Total	579	672	768	3.02	2.71					

[a]Totals may not add due to rounding. [b]NA - not available. [c]Undefined.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Duchesne County

Duchesne County had a total employment of 5,632 in 1980, a 112% increase since 1970. Total employment grew 12.09% annually between 1970 and 1975, but only 3.68% annually in the subsequent five year period. Nonfarm proprietors was the fastest growing sector between 1970 and 1975, while manufacturing was the fastest growing sector between 1975 and 1980. Employment in the mining, contract construction, and manufacturing sectors totaled 1,455 in 1980. No data were available for those sectors in 1970. Government, mining, and wholesale and retail trade were the largest sectors in 1980.

Emery County

The total employment of 5,452 in Emery County in 1980 was a 199% increase since 1970. The number of workers grew over 10% annually throughout the period. The most rapid growth was in the transportation, communication, and utilities sector, which increased 34.92% annually between 1970 and 1975 and 27.54% annually between 1975 and 1980. Employment in the mining sector jumped from 366 in 1970 to 2,105 in 1980. Employment in the contract construction and manufacturing sectors totaled 544 in 1980, but no data were available for those sectors in 1970. Mining had 1,389 more employees than government in 1980, the next largest sector in the county.

Garfield County

Agricultural employment in Garfield County decreased from 281 in 1970 to 236 in 1980. This decline occurred between 1970 and 1974. Employment in the county fluctuated between 1974 and 1980. The largest increase in the county between 1970 and 1975 was in the services sector, while the largest increase between 1975 and 1980 was in the contract construction sector. Employment in the contract construction and manufacturing sectors was 238 in 1970. In 1980, employment in the mining, contract construction, and manufacturing sectors numbered 837. Government and contract construction were the largest sectors in 1980.

Grand County

Grand County had a total employment of 3,696 in 1980, a 49% increase since 1970. Employment in the county increased 2.06% annually between 1970 and 1975 and 6.18% annually between 1975 and 1980. The wholesale and retail trade sector increased most rapidly between 1970 and 1975, while the mining sector increased most rapidly between 1975 and 1980. The total of 1,150 workers in the combined mining, contract construction, and manufacturing sectors represented a 55% increase since 1970. Wholesale and retail trade, mining, and government were the largest sectors in 1980.

Uintah County

Uintah County had a total employment of 8,153 in 1980, a 77% increase since 1980. Growth in employment was twice as rapid between 1970 and 1975 than between 1975 and 1980. The transportation, communication, and utilities sector increased most rapidly between 1970 and 1975, while the mining sector increased most rapidly between 1975 and 1980. Employment in the mining, contract construction, and manufacturing sectors increased a total of 2,058, or 81% increase since 1970. Mining, services, and wholesale and retail trade were the largest sectors in 1980.

Wayne County

Total employment in Wayne County increased from 579 in 1970 to 768 in 1980. The growth in employment was relatively constant -- about 3% annually -- throughout the period. The nonfarm proprietors sector increased most rapidly between 1970 and 1975 and between 1975 and 1980. Employment in the mining, contract construction, and manufacturing sectors totaled 130 in 1980. No data were available for these sectors in 1980. Government, agriculture, and nonfarm proprietors were the largest sectors in 1980.

2.3.2.2 Projections of Baseline Employment

The baseline employment projections describe the future of the counties based on the existing and future economic structure and the changing demographic characteristics of the population. The projections are not a prediction of the future but rather an attempt to depict the likely direction of current trends in the area without tar sands development. Characteristic of the baseline projections are declining rates of growth over time. It is assumed that with a given economic structure, an area will begin to stabilize as its economy matures. Under these conditions, accelerated growth would require increases in the basic employment sectors that would change the economic structure of the area. The Utah Process Economic and Demographic Impact Projection Model (UPED) and the Spatial Allocation Model (SAM) were applied in making the baseline projections (see Sec. 1.4 and Appendix A).

Obviously a recession of the magnitude experienced in 1981-82 will have an impact on the baseline projections for Utah. The projections presented herein were produced for the State of Utah* before the severity of the 1981-82 national recession and its full impact on the state of Utah became apparent. These projections assume that the national recession would have ended in 1982 and that recovery would occur during 1983 and that 1983 would be a growth

*The projections were prepared by the State of Utah, Office of the State Planning Coordinator.

year. The projections also assume that the recession will have no permanent deleterious structural effect on the energy and minerals industries in the state or on the economy in general. The validity of this assumption cannot be determined until a national recovery is well under way.

Figure 2.18 illustrates the change in baseline employment projected between 1980 and 2005. It is evident from this figure that all counties are projected to experience some employment growth between 1980 and 2005. The fastest rate of increase appears to be 1980 and 1985 for most counties. However, Carbon and Uintah counties are expected to remain on an almost continuous growth trend throughout the period, while the other counties are forecast to have relatively little change between 1985 and 2005 -- less than 1% annually in most cases. A detailed description of the baseline employment projections by industrial sector for each county is presented and discussed below.

Carbon County

In Carbon County, the baseline projections of employment assume a rapid growth in coal production between 1980 and 1990. Recent layoffs in the industry make it appear that the short term projections might have been

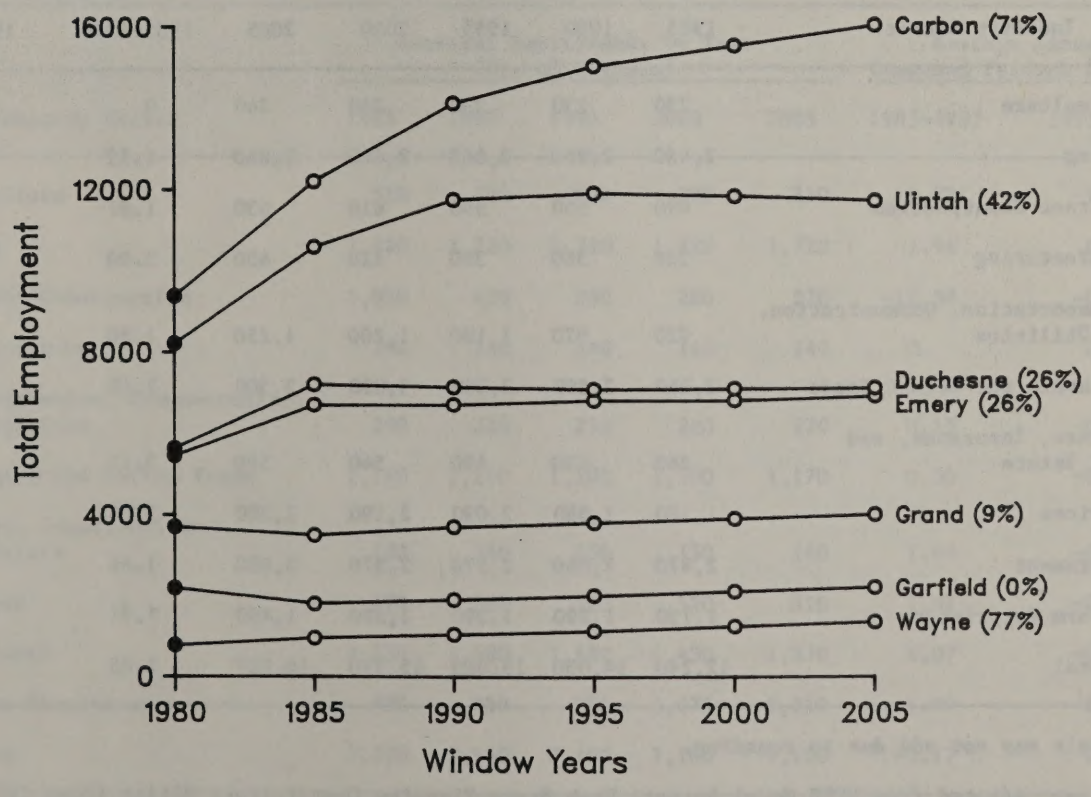

Fig. 2.18 Baseline Projections of Total Employment by County, 1980-2005 (1980-2005 percent change in parentheses)

overstated. It is still too early to tell whether or not the longer-term projections for the coal industry have been overstated. The projects that would create the demand for the coal are described under Emery County. After 1990, coal production is assumed to remain stable. Other sectors which would drive growth in the local economy are assumed to follow historical paths throughout the projection period.

Carbon County is projected to have the second largest growth in employment in the region. The total employment of 16,020 in 2005 would be a 71% increase over 1980 and 31% greater than the projected 1985 level. The annual rate of growth would be 2.05% from 1985 to 1995 and 0.66% from 1995 to 2005 (Table 2.7). The most rapid increase is expected to occur in the finance, insurance, and real estate sector, which would increase 3.13% annually between 1985 and 1995 and 1.87% annually between 1995 and 2005. Wholesale and retail trade would be the largest employment sector in the county in 2005, followed by government and mining.

Table 2.7 Baseline Employment Projections by Industrial Sector -- Carbon County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	230	230	230	240	240	0	0.43
Mining	2,460	2,860	2,860	2,860	2,860	1.52	0
Contract Construction	490	550	590	610	630	1.87	0.66
Manufacturing	320	360	390	420	450	2.00	1.44
Transportation, Communication, and Utilities	920	970	1,100	1,200	1,250	1.80	1.29
Wholesale and Retail Trade	2,260	2,590	2,890	3,090	3,300	2.49	1.34
Finance, Insurance, and Real Estate	360	430	490	540	590	3.13	1.87
Services	1,580	1,890	2,090	2,190	2,300	2.84	0.96
Government	2,470	2,880	2,970	2,970	3,000	1.86	0.10
Nonfarm Proprietors	1,150	1,290	1,390	1,390	1,400	1.91	0.07
Total	12,240	14,050	15,000	15,510	16,020	2.05	0.66

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Duchesne County

In Duchesne County, basic employment in the oil and gas industry is projected to increase during the 1980s, albeit at slower rates of growth than were evidenced during the seventies. Oil and gas employment did increase significantly during the first few years of the 1980s, but currently oil and gas activity has slowed. How long the industry will stay depressed cannot yet be foreseen. In the baseline projections, the oil and gas industry is projected to reach maturity in 1990 and remain constant thereafter. Very little change is anticipated in other basic sectors in the baseline projections.

Total employment in Duchesne County is projected to increase 26% between 1980 and 2005. Total employment is expected to fluctuate somewhat from 1985 to 2005; at no time would the change be more than 1% annually. Table 2.8 shows that the nonfarm proprietors sector would increase most rapidly: 1.99% annually from 1985 to 1995 and 2.45% annually from 1995 to 2005. Mining would be the largest sector in 2005, but the number of employees in the sector (1,720) would not change between 1990 and 2005. Government,

Table 2.8 Baseline Employment Projections by Industrial Sector -- Duchesne County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	510	460	420	380	350	-1.92	-1.69
Mining	1,420	1,720	1,720	1,720	1,720	1.94	0
Contract Construction	1,050	420	280	280	270	-12.38	-0.36
Manufacturing	140	140	140	140	140	0	0
Transportation, Communication, and Utilities	220	220	230	220	220	0.45	-0.22
Wholesale and Retail Trade	1,170	1,210	1,205	1,190	1,170	0.30	-0.29
Finance, Insurance, and Real Estate	130	140	150	150	140	1.44	-0.35
Services	470	500	520	520	510	1.02	-0.10
Government	1,330	1,480	1,480	1,430	1,370	1.07	-0.77
Nonfarm Proprietors	780	850	950	1,070	1,210	1.99	2.45
Total	7,220	7,140	7,100	7,100	7,100	-0.17	0

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

nonfarm proprietors, and wholesale and retail trade would also employ over 1,000 workers each.

Emery County

The baseline projections in Emery County assume a 71% increase in coal production between 1980 and 1990. But recent layoffs in the industry would tend to indicate that the short-term projections might have been overstated. It is not yet possible to determine whether or not the longer-term projections for the coal industry have been overstated. After 1990, coal production is assumed to remain stable. The demand for coal is created primarily by the development of the first two units of the Intermountain Power Project and units 3 and 4 of the Hunter Power Plant complex. The Utah Power and Light's power plant construction plans include units 3 and 4 of the Hunter Power Plant. Unit 3 is assumed to be completed on schedule in 1983. The Hunter Unit 4 is assumed to be delayed three years from its original schedule; construction would begin in 1985 with completion scheduled for 1987. Other sectors of the local economy are assumed to follow historical paths throughout the projection period.

Total employment in Emery County is projected to increase 26% between 1980 and 2005. Table 2.9 shows that this growth would occur at a 0.06% rate between 1985 and 1990, and 0.16% annually thereafter. The most rapid growth from 1985 to 1995 is expected to be in the manufacturing sector, while the most rapid growth from 1995 to 2005 would be in the services sector. Of the 6,880 employees projected to be in the county in 2005, 2,500 would be working in the mining sector. Transportation, communication, and utilities would be the next largest sector with 880 employees in 2005.

Garfield County

Much interest and discussion has centered around coal development in the Alton fields and the use of this coal to fire the proposed Allen Power Plant near Las Vegas, Nevada. This project is currently on hold and must overcome several obstacles before it becomes a reality. Because of the uncertainty associated with this project, and because coal development has historically not been a significant part of the economic structure of the area, Alton coal development or any associated power plant development was not included in the baseline projections. Uranium mining at Ticaboo in eastern Garfield County is assumed to remain constant until 1985, at late 1982 depressed levels, when it is assumed to increase to its early 1982 levels and remain constant thereafter. Tourism and trade are assumed to continue to be the driving force behind any growth in Garfield County under the baseline conditions. Growth in these industries is assumed to follow historical patterns. Agriculture is assumed to decline over the projection period, consistent with historical trends. Commuting patterns, as identified from

Table 2.9 Baseline Employment Projections by Industrial Sector -- Emery County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	360	360	360	370	370	0	0.27
Mining	2,460	2,500	2,500	2,500	2,500	0.16	0
Contract Construction	850	440	470	480	500	-5.75	0.62
Manufacturing	40	50	50	50	50	2.26	0
Transportation, Communication, and Utilities	720	820	840	860	880	1.55	0.47
Wholesale and Retail Trade	630	670	700	700	730	1.06	0.42
Finance, Insurance, and Real Estate	60	60	70	70	70	1.55	0
Services	340	380	400	430	450	1.64	1.18
Government	770	840	840	810	800	0.87	-0.49
Nonfarm Proprietors	500	530	540	530	530	0.77	-0.19
Total	6,730	6,650	6,770	6,800	6,880	0.06	0.16

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

employers and other primary data sources, are assumed to remain fairly constant.

Total employment in Garfield County is forecast to decrease slightly (-0.41%) between 1980 and 2005. A drop in employment is shown to occur in Table 2.10 between 1980 and 1985, followed by a roughly 1% annual increase from 1985 to 2005. The most rapid increase would occur in the wholesale and retail trade sector and the finance, insurance, and real estate sectors. Employment in each of those sectors is projected to increase 50% between 1985 and 2005. Government, nonfarm proprietors, and wholesale and retail trade would be largest employment sectors in the county in 2005, according to these projections.

Grand County

Uranium mining has formed the economic base of Grand County for several decades and has been the source of historical boom periods for the county.

Table 2.10 Baseline Employment Projections by Industrial Sector -- Garfield County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	180	170	160	150	160	-1.17	0
Mining	230	240	240	250	260	0.43	0.80
Contract Construction	70	70	70	70	70	0	0
Manufacturing	180	190	210	230	240	1.55	1.34
Transportation, Communication, and Utilities	90	90	90	100	100	0	1.06
Wholesale and Retail Trade	200	230	260	290	300	2.66	1.44
Finance, Insurance, and Real Estate	20	30	30	30	30	4.14	0
Services	240	250	260	270	290	0.80	1.10
Government	350	370	380	390	410	0.83	0.76
Nonfarm Proprietors	220	240	270	300	310	2.07	1.39
Total	1,780	1,880	1,970	2,080	2,170	1.02	0.97

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

This industry also has experienced periods of decline, which is the current state of the industry; the price of processed uranium ore fell from $42 per pound in 1978 to about $27 per pound in 1981. Uranium production and employment are assumed to remain at their 1982 depressed levels through the year 2000. This assumption was developed from information gathered from local planners, industry representatives, and national uranium production forecasts. Oil and gas development was assumed to grow at a 2.4% annual rate throughout the 1980s and remain stable thereafter. Other primary sectors, such as tourism, are assumed to follow historical paths throughout the projection period.

Total employment in the county is forecast to increase 9% between 1980 and 2005. After a slight drop between 1980 and 1985, employment is projected to increase by less than 1% annually from 1985 through 2005 (Table 2.11). The transportation, communication, and utilities sector would increase more rapidly than any other sector between 1985 and 2005, but it is expected to decrease 4.18% annually between 1995 and 2005. The services sector would grow most rapidly between 1995 and 2005. In 2005, wholesale and retail trade, government, and mining would be the largest employment sectors in the county.

Table 2.11 Baseline Employment Projections by Industrial Sector -- Grand County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	180	190	190	190	190	0.54	0
Mining	430	430	430	430	650	0	4.22
Contract Construction	210	220	230	240	250	0.91	0.84
Manufacturing	90	90	90	90	100	0	1.06
Transportation, Communication, and Utilities	390	430	460	480	300	1.66	-4.18
Wholesale and Retail Trade	660	690	700	700	740	0.59	0.56
Finance, Insurance, and Real Estate	80	90	90	90	100	1.18	1.06
Services	430	480	500	530	570	1.52	1.32
Government	620	670	680	670	660	0.93	-0.30
Nonfarm Proprietors	440	450	460	460	470	0.45	0.22
Total	3,530	3,740	3,830	3,880	4,030	0.82	0.51

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Uintah County

In Uintah County, basic employment in the oil and gas industry is projected to increase during the 1980s at slower rates of growth than were evidenced during the seventies. Oil and gas employment did increase significantly during the early part of the 1980s, but currently oil and gas activity has slowed. How long the industry will remain depressed cannot yet be foreseen. In the baseline projections, the oil and gas industry is projected to reach maturity in 1990 and remain constant thereafter. The construction of the Bonanza Power Plant would create a small peaking of employment in 1984 and is expected to contribute to the increase in basic employment as the plant moves into the operations phase. Construction of portions of the Central Utah Project are also assumed in the baseline. The Central Utah Project would provide 800 jobs through 1985, declining to less than 200 by 1990. Very little change is anticipated in the other basic sectors included in the baseline employment projections.

Employment in Uintah County is projected to total 11,710 in 2005, a 42% increase since 1980. All of this growth is forecast to occur by 1995, and the county would experience a slight decline in growth from 1995 to 2005 (-0.16%). Nonfarm proprietors would be the fastest growing sector, increasing 2.00% annually from 1985 to 1995 and 1.90% annually from 1995 to 2005. In Table 2.12, mining is shown to account for 2,890 of the employees expected to be in the county in 2005. Government, services, and wholesale and retail trade would employ over 1,800 workers each.

Wayne County

The economic base of Wayne County consists of agriculture and government employment. Agricultural employment is assumed to remain constant through the projection period. Basic employment in government is assumed to grow slightly through the projection period, consistent with historical growth rates.

Table 2.12 Baseline Employment Projections by Industrial Sector -- Uintah County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	430	380	350	320	300	-2.04	-1.53
Mining	2,440	2,900	2,890	2,890	2,890	1.71	0
Contract Construction	380	400	400	400	400	0.51	0
Manufacturing	400	400	410	400	400	0.24	-0.25
Transportation, Communication, and Utilities	690	720	740	740	720	0.70	-0.27
Wholesale and Retail Trade	1,740	1,860	1,870	1,840	1,800	0.72	-0.38
Finance, Insurance, and Real Estate	180	200	200	200	200	1.06	0
Services	1,730	1,840	1,870	1,860	1,830	0.78	-0.22
Government	1,760	2,090	2,110	2,000	1,890	1.83	-1.10
Nonfarm Proprietors	870	970	1,060	1,180	1,280	2.00	1.90
Total	10,620	11,760	11,900	11,830	11,710	1.14	-0.16

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Wayne County is forecast to have the fastest employment growth, in percentage terms, of any county in the region. Total employment is projected to be 1,360 in 2005, a 77% increase from 1980 (Table 2.13). All sectors except agriculture, services, and finance, insurance, and real estate would increase by at least 1.5% annually between 1985 and 1995. Similarly, 7 of the 10 sectors are expected to increase by at least 1% annually between 1995 and 2005. The government sector would employ 430 workers in 2005, the most of any sector in the county.

2.3.3 Trends in Monthly Wages and Personal Income

This section discusses the average monthly wages by sector and county, and the total and per capita income by county. Also included is a projection of total personal income between the years 1985 and 2005. All data are provided in constant 1980 dollars (1980 $).

Table 2.13 Baseline Employment Projections by Industrial Sector -- Wayne County (1985-2005)[a]

Industry Sector	Sectoral Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	170	170	170	170	190	0	1.12
Mining	30	30	40	50	50	2.92	2.26
Contract Construction	130	140	160	190	210	2.10	2.51
Manufacturing	30	40	40	40	50	2.92	2.26
Transportation, Communication, and Utilities	2	2	3	3	3	4.14	0
Wholesale and Retail Trade	50	60	60	70	80	1.84	2.92
Finance, Insurance, and Real Estate	20	20	20	20	20	0	0
Services	30	30	30	30	30	0	0
Government	290	330	360	390	430	2.19	1.79
Nonfarm Proprietors	210	230	250	280	300	1.76	1.84
Total	960	1,050	1,130	1,240	1,360	1.64	1.87

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

2.3.3.1 Average Monthly Wages by Sector and County (1975-1980)

The average monthly wages for each major nonagricultural employment sector are provided in Table 2.14 by county. Only the 1980 wage level is presented with the 1975-1980 growth rate; Table B.8 in Appendix B contains the annual data.

The mining; construction; and transportation, communications, and utilities sectors have shown the highest average wage levels during the 1975-1980 time period. Under the baseline projections and proposed scenario developments, increased employment would be primarily concentrated in the mining and construction sectors. Each sector is briefly described below.

Mining

Overall, mining paid the highest wages of any industrial sector in the area through 1980. The highest wages in mining were found in Carbon ($1,980 per month) and Emery ($1,966 per month) counties. Garfield County was the lowest by a fair margin, with an average monthly wage of only $1,346 in 1980.

Significant annual increases occurred in both Wayne and Uintah counties between 1975 and 1980. The annual rates were 18.52% and 14.81%, respectively. It should be noted, however, that both of these counties had very low average monthly wages in 1975. Thus, the large percentage increase was possible. Duchesne (0.49%) and Grand (2.52%) had the lowest annual increases. All counties experienced steady growth in wages throughout the period except Duchesne, where wages dropped from $2,084 in 1978 to $1,834 in 1980. For Duchesne County this $2,084 was the highest average monthly wage paid in the mining sector during the five year period.

Contract Construction

Emery County had by far the highest wage level in this sector, with an average monthly wage of $2,410 in 1980. This figure was almost $700 over the next highest ($1,769 in Wayne County) and was over double the lowest wage in the region ($1,071 in Garfield County).

It should be noted that although Garfield County had the lowest average monthly wage of all counties in this sector in 1980, this wage was 66% higher than the wage level that existed in 1975. Emery County also showed a dramatic increase in the level of contract construction wages paid during the period with an annual increase of 8.65% (an increase of 65% over the five year period). Grand County realized the least increase in contract construction wages with an annual increase of 2.17%.

Table 2.14 Average Monthly Nonagricultural Wages by Industrial Sector and County: 1980 and Rate of Change (1980 $)

	Carbon County		Duchesne County		Emery County		Garfield County		Grand County		Uintah County		Wayne County	
Industry Sector	1980	Average Annual % Change[a] 1975-1980	1980	Average Annual % Change[a] 1975-1980	1980	Average Annual % Change[a] 1975-1980	1980	Average Annual % Change[a] 1975-1980	1980	Average Annual % Change[a] 1975-1980	1980	Average Annual % Change[a] 1975-1980	1980	Average Annual % Change[a] 1975-1980
Mining	1,980	8.23	1,834	0.49	1,966	9.49	1,346	5.63	1,601	2.52	1,754	14.81	1,461	18.52
Contract Construction	1,401	5.80	1,570	4.62	2,410	8.65	1,071	8.79	1,702	2.17	1,244	4.41	1,769	–[b]
Manufacturing	820	4.83	1,365	7.23	882	–[b]	972	8.99	714	-6.48	988	7.45	381	–[b]
Transportation, Communication, and Utilities	1,725	8.49	1,615	3.12	1,777	11.62	1,214	5.98	1,279	-2.58	1,521	8.18	906	–[b]
Wholesale and Retail Trade	775	8.50	708	0.21	490	5.82	420	7.78	796	-1.84	883	5.46	337	6.42
Finance, Insurance, and Real Estate	849	2.32	875	0.68	806	–[b]	833	12.77	973	2.46	917	–[b]	1,844	–[b]
Services	704	10.11	787	0	716	13.44	640	14.70	662	1.18	983	8.70	431	–[b]
Government	855	4.97	809	-2.64	842	6.11	828	4.55	1,054	0.24	1,041	7.30	794	6.44

[a]Computed as the compound average annual percent change.

[b]Undefined.

Source: adapted from the Utah Department of Employment Security, selected *Annual Reports* (1975-1980).

Finally, Emery County was the only county which showed a steady increase in construction wages over the five year period. All other counties experienced increases and decreases from year to year. (See Table B.8 in Appendix B.)

Manufacturing

The average monthly wages paid for manufacturing employment were highest in Duchesne County where the 1980 figure was $1,365. No other county had a wage level greater than $1,000 per month. Regionwide, the lowest wages paid in this sector were in Wayne County, where the average monthly wage was a mere $381. All other counties fell in the $700-$1,000 range.

Garfield County exhibited the greatest growth in wages over the period, with an annual increase of 8.99%. Duchesne County showed a substantial yearly increase with a rate of 7.23%. However, Grand County experienced a decline in average monthly wages, dropping from $1,067 per month in 1975 to $714 per month in 1980. Grand County reached a low of $629 per month in 1978.

Most counties experienced a cyclical pattern over the five year period, in terms of the monthly wages paid to manufacturing employment. Garfield and Uintah are the only counties which realized a steady increase for all five years.

Transportation, Communication, and Utilities

Emery and Carbon counties had the highest average monthly wage in this sector for 1980, at $1,777 and $1,725 respectively. Wayne County was the only county with a wage level below $1,000 at $906 per month.

Emery County also had the greatest increase in average monthly wages during the period studied. The $1,777 paid to Emery County workers in 1980 was 93% higher than the 1975 wage in this sector. Carbon and Uintah county workers also realized wage increases of 60% or more over the five year period. In Grand County, however, this industrial sector experienced a decrease in wages of 2.58% annually.

Emery, Carbon, and Uintah counties underwent steady monthly wage increases over the entire period. All the other counties, however, rose and fell throughout the five years. (See Table B.8, Appendix B).

Wholesale and Retail Trade

The highest average monthly wages in this sector were paid in Uintah ($883) and Grand ($796) counties. Wayne County had the lowest monthly wage at $337.

Although Grand County had one of the highest monthly wages, the 1980 wage level of $796 was 11% lower than the 1975 wage of $890 per month. All other counties showed increases in the level of wages paid over the period, although in Duchesne County this increase was only 0.21% annually. The greatest percentage increases in average monthly wages occurred in Carbon County (8.5% annually) and Garfield County (7.78% annually).

Wages in Grand County decreased every year over the period studied. Most other counties fluctuated from year to year. It is interesting to note that in Duchesne County, monthly wages decreased 17% from 1977 to 1978. This was followed in 1979 by a 26% increase over the 1978 wage.

Finance, Insurance, and Real Estate

The average monthly wage for this sector was $1,844 in Wayne County. This wage level was substantially higher than any other county. All other counties, in fact, are grouped in the $800 to $1,000 per month range.

It is important to note, moreover that the monthly wage in Wayne County in 1980 was 13.1% lower than the $2,122 paid in 1977. During this same three year period, the monthly finance wages in Emery County increased by 120%: $366 per month in 1977 to $806 in 1980. Average monthly wages in Garfield County more than doubled over the period ($405 in 1977 to $833 in 1980) while in Duchesne County monthly wages increased by only $35 over the five year period.

In this sector, as in most others, there was considerable wage movement throughout the period. Only in Garfield and Emery counties did monthly wages show an increase in each year considered.

Services

Uintah had the highest monthly wage in this sector with an average of $983 in 1980. Wayne County had the lowest average wage in 1980 at $431 per month. Wages in all other counties fell into the $640 to $787 per month range.

Three counties experienced substantial annual increases in average monthly wages. They were Garfield (14.70%), Emery (13.44%), and Carbon (10.11%) counties. In Garfield County, the average wage of $640 per month in 1980 was 127% higher than the $281 per month paid in 1975. Duchesne County had the same average wage in 1980 as in 1975 -- $787 per month.

Fluctuations in the wage levels by county are again evident throughout the period (see Table B.8, Appendix B). Average monthly wages in Carbon, Garfield, and Uintah counties increased each year throughout the period. Dramatic increases in the wage levels occurred in the period from 1979 to

1980. In Garfield County, monthly wages increased by 35% in this one-year period while in Wayne County the increase amounted to a 56% change.

Government

In this sector, Grand and Uintah counties are the only counties with an average monthly wage over $1,000 in 1980. Government wages are $1,054 per month in Grand and $1,041 in Uintah counties. All other counties have an average wage within the $784 to $855 per month range.

Almost all counties experienced rapid wage increases over the period. Five counties had annual increases over 4.0%, led by Emery with a 6.11% increase per year. Grand (at 0.24% per year) and Duchesne (at -2.64% per year) are the only counties that did not experience a rapid increase in monthly government wages.

Average monthly wages in most counties increased steadily over the five year period. Grand County reached a peak of $1,193 per month in 1977 and then declined steadily to $1,054 in 1980. Similarly, Duchesne County experienced a 12% decrease in government wages from 1979 to 1980.

2.3.3.2 Total and Per Capita Personal Income by County

This section analyzes the trends in total and per capita personal income by county from 1970 to 1980. These county figures will also be related to state figures for the same period. County per capita personal income (PCPI) and the PCPI ratio of a county to the state are shown in Table 2.15. Table B.9 in Appendix B displays the total personal income data by county for the years 1970-1980. All data are presented in 1980 dollars.

Per capita income has increased in all seven counties from 1970 to 1980. However, not every county increased at a steady or continuous rate. Figure 2.19 graphically illustrates the pattern of personal income growth exhibited by the counties. The state per capita income increased by 12% over the 10 year period. Total personal income for the state increased by 55% between 1970 and 1980. A description of the county trends follows.

Carbon County

Carbon County experienced a 42% increase in per capita personal income from 1970 to 1980. In 1979, per capita income peaked at $10,489; this was also the highest per capita income in any county during the 10 year period. The annual change in Carbon County per capita income was gradual; the biggest increase came in 1979 (17% over the 1978 figure). The largest decrease during the period occurred in 1980, when the figure was 13% below 1979.

Table 2.15 County Per Capita Personal Income (PCPI) and PCPI Ratio of County to State, 1970-1980 (1980 $)

Year	State of Utah PCPI	Carbon County		Duchesne County		Emery County		Garfield County		Grand County		Uintah County		Wayne County	
		PCPI	Ratio	PCPI	Ratio	PCPI	Ratio	PCPI	Ratio	PCPI	Ratio	PCPI	Ratio	PCPI	Ratio
1970	6,825	6,409	0.9390	5,057	0.7410	4,852	0.7109	5,252	0.7695	6,673	0.9777	5,364	0.7859	4,796	0.7027
1971	7,005	6,298	0.8991	4,863	0.6942	4,183	0.5971	5,878	0.8391	6,320	0.9022	5,180	0.7359	4,846	0.6918
1972	7,347	6,840	0.9310	5,793	0.7885	5,221	0.7106	6,384	0.8689	7,322	0.9966	5,943	0.8089	5,902	0.8033
1973	7,531	7,272	0.9656	6,504	0.8636	6,000	0.7967	6,743	0.8954	7,564	1.0044	6,472	0.8594	6,322	0.8395
1974	7,439	7,355	0.9887	6,561	0.8820	5,801	0.7798	6,552	0.8808	7,684	1.0329	6,938	0.9327	5,892	0.7920
1975	7,382	7,759	1.0511	6,387	0.8652	5,948	0.8057	5,974	0.8093	7,658	1.0374	6,852	0.9282	5,684	0.7700
1976	7,693	8,264	1.0742	6,794	0.8831	6,639	0.8630	6,725	0.8742	8,295	1.0783	7,023	0.9129	5,640	0.7331
1977	7,890	8,583	1.0878	6,921	0.8772	7,094	0.8991	6,779	0.8592	8,439	1.0696	7,152	0.9065	5,949	0.7540
1978	8,076	8,964	1.1100	7,205	0.8921	7,385	0.9144	6,838	0.8467	8,392	1.0391	7,692	0.9525	6,652	0.8237
1979	8,096	10,489	1.2956	8,274	1.0220	8,078	0.9978	6,892	0.8513	9,458	1.1682	8,857	1.0940	6,853	0.8465
1980	7,631	9,105	1.1932	7,302	0.9569	6,810	0.8924	6,963	0.9125	8,865	1.1617	7,837	1.0270	6,239	0.8176

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, Table 5, (April 1982) and the Utah Population Committee.

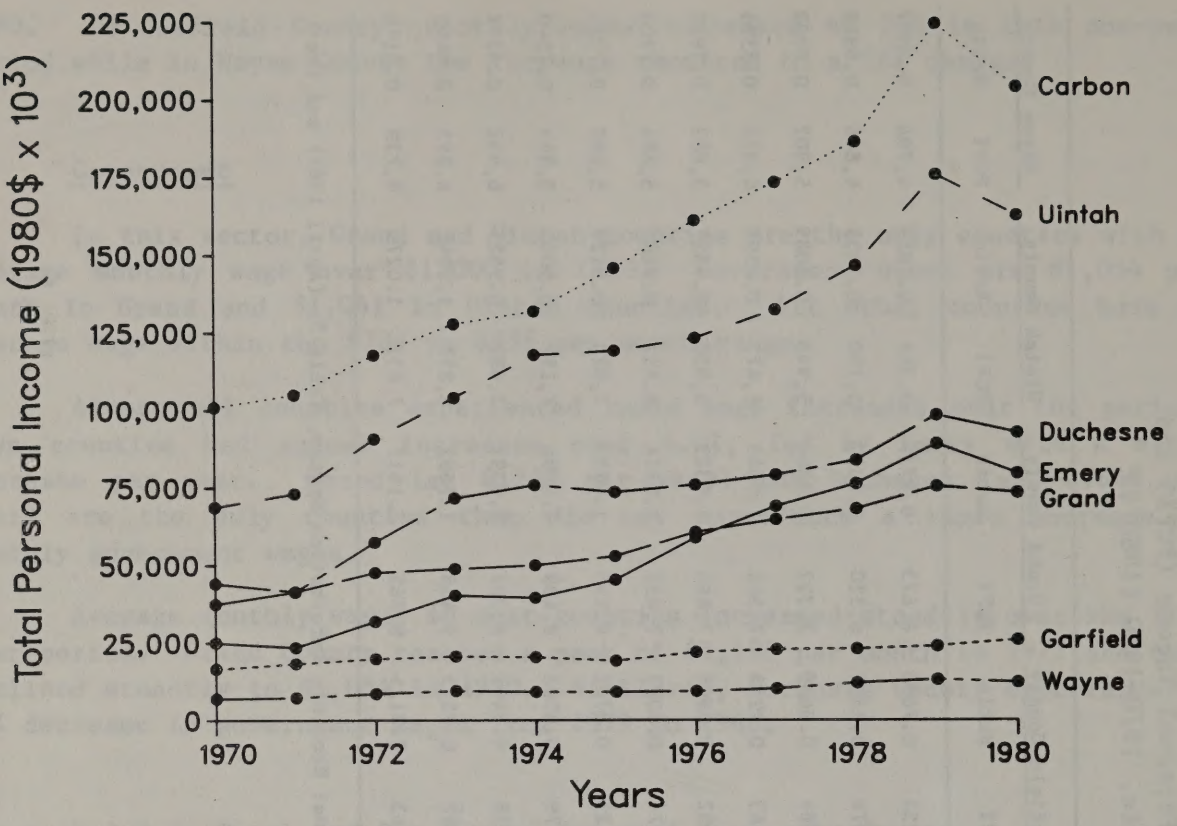

Fig. 2.19 Total Personal Income by County, 1970-1980

In 1980, the ratio of per capita personal income (PCPI) in Carbon County to that of the state was 1.1932. This compares to a ratio of 0.9390 in 1970. In 1979, the ratio of per capita incomes was 1.2956; the highest ratio for any county during the 1970-1980 period. PCPI in Carbon County has been larger than the corresponding state figure every year since 1975.

Total personal income in the county increased 102% from 1970 to 1980. The greatest increase was seen from 1978 to 1979 when it increased by 20%. During this same period (1978-1979), state personal income increased only 4.1%.

Duchesne County

Per capita personal income in Duchesne County increased by 44% from 1970 to 1980. Only Uintah County recorded a greater percentage increase. Duchesne, like Carbon County, recorded its highest PCPI in 1979, with an average of $8,274. The greatest increase over the period was from 1971 to 1972, when PCPI rose by 19%. Three times during the period (1971, 1975, and 1980) per capita personal income was lower than the previous year.

The PCPI ratio of Duchesne County to the state was 0.9569 in 1980. In 1970, the ratio was only 0.7410. Only once during the period did the PCPI ratio climb over 1.0; in 1979, the figure reached 1.0220.

Personal income increased by 147% from 1970 to 1980. This rate of change was second only to Emery County, and was almost three times the comparable state figure.

Emery County

Emery County experienced a 40% increase in per capita personal income between 1970 to 1980. The 1980 PCPI figure was lower by 16% than the 1979 level. Only once during the 10 year period did PCPI reach $8,000: the 1979 PCPI was $8,078. In 1971, PCPI in Emery County was $4,183, the lowest income level recorded by any county. Emery County per capita personal income for 1980 ($6,810) was its lowest figure since 1976.

In 1980, the ratio of PCPI for Emery County to the whole state was 0.8924. The PCPI was 0.5971 in 1971, the lowest in the region and time period studied. The county-state ratio of PCPI never surpassed 1.0 for the period.

Personal income in Emery County increased a significant 218% between 1970 and 1980. This was nearly four times the statewide increase of 55%. Although its total level of personal income was lower in 1970, Emery surpassed Grand County in total personal income by 1977. This was due in part to a 36% increase from 1971 to 1972.

Garfield County

Per capita personal income increased by 33% in Garfield County in the past decade. Garfield is the only county that did not experience a decrease between 1979 to 1980. The increase in per capita personal income was very constant over the entire period in Garfield County. The only decrease in per capita income came in 1975.

The ratio of Garfield County and the State of Utah PCPI was 0.9125 in 1980, the highest figure for the period studied. Moreover, Garfield is the only county where the 1980 PCPI figure was the highest during the 10-year period.

Total personal income rose 56% from 1970 to 1980. This rate of change is just 1% above the state average. The personal income in 1980 was again a peak for Garfield County, as total personal income increased only very gradually throughout the period.

Grand County

Per capita personal income in Grand County reached a peak in 1979, when it equaled $9,458. This income level was the second highest recorded for the region. Overall, from 1970 to 1980, PCPI increased 33%. Four times during the 10-year period the PCPI level was lower than the year before. This happened in 1971, 1975, 1978, and 1980.

In 1980, Grand County had a per capita personal income level of 1.1617 relative to the state. The Grand County ratio of 0.9777 in 1970 was the highest county-state ratio of all counties in that year. Furthermore, this ratio has been over 1.0 in every year since 1973, and between 1970 and 1974 remained the highest ratio of all counties considered.

Personal income in Grand County increased 66% between 1970 and 1980. No significant trends could be identified.

Uintah County

Uintah County experienced a 46% increase in PCPI from 1970 to 1980. This was the largest percentage increase computed for any county. Per capita personal income increased by 15% between 1978 and 1979, and reached a high of $8,857 in 1979.

For both 1979 and 1980 the PCPI for Uintah County was above that of the state, with a ratio in 1980 of 1.0270. This ratio had increased from 0.7359 in 1971.

Personal income rose by 136% between 1970 and 1980. It increased every year until 1980. The greatest increase occurred in 1972, when personal income rose by 24% over 1971; during the same period, state total personal income rose only 8%.

Wayne County

Per capita personal income in Wayne County increased by 30% between 1970 and 1980; this was the lowest percentage change for any of the counties studied. In 1972, PCPI was $6,322. This level of per capita income was not surpassed until 1978. On four occasions PCPI was lower than the previous year -- 1973, 1974, 1975, and 1980. Per capita personal income never climbed above the $7,000 level.

The ratio of per capita personal income for Wayne County to the state was 0.8176 in 1980; lower than any other county for that year. The PCPI figure of 0.6918 in 1971 was the second lowest figure recorded in the region.

In Wayne County, personal income rose 75% from 1970 to 1980. In 1973, a total of $9.5 million was earned. This income level was not surpassed during the three subsequent years.

2.3.3.3 Baseline Personal Income Projections

The relationship of per capita personal income between the state and each county, discussed in the previous section (Sec. 2.3.3.2), was used in making the baseline personal income projections for each county. The relationship of county per capita income to the average state per capita income is provided in Table 2.15. The baseline per capita personal income projections for the state are assumed to grow at an annual rate of 1.7%*; by the year 2000, the state per capita income would be $11,568.

Carbon County achieved higher average per capita income levels, relative to the state, than the other six counties during the last half of the 1970s. It is assumed that this phenomenon would be reversed during the next two decades, so that by the year 2000, Carbon County per capita personal income would equal that of the state. Per capita personal income in Emery, Grand, and Uintah counties is presumed to stabilize at 100% of the state value for the entire projection period (1985-2005). In Duchesne County per capita income has risen relative to the state average throughout the 1970s. This trend is assumed to continue with per capita income for Duchesne County reaching 95% of the state PCPI value. Garfield and Wayne counties have had personal income levels consistently below the state average; it is assumed that these counties would maintain per capita income levels that would be 85% and 80% of the state average, respectively, over the projection period.

Total personal income by county is presented in Table 2.16. These values are derived by multiplying the county-specific per capita income projections by the baseline population projections, for each year. The total personal income projections by county are graphically illustrated in Fig. 2.20.

Between 1985 and 2005, it is projected that all counties except Carbon would experience a 40.9% increase in per capita personal income. The PCPI for the state would also increase by 40.9% over this period. The 40.9% increase in both cases is a result of the assumed annual growth rate (1.7%). Per capita personal income in Carbon County would increase by 23.6% from 1985 to 2005.

All counties would experience a substantial increase in total personal income. In 2005, total personal income in Wayne County would be 94.6% greater than in 1985; in Garfield this figure would be 70.4%. Carbon County would still have the greatest total personal income: $469 million. In 2005, total personal income would be more than $100 million greater in Carbon County than Uintah County, a 33% difference.

Although total personal income is projected to increase in all counties for the period 1985 to 2005, the growth in personal income is not forecast to be as large as the increases recorded for this region in the 1970s.

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*See Appendix A for a discussion of the methodology and assumptions.

Table 2.16 Baseline Personal Income Projections
By County, 1985-2005 (1980 $)

Geographic Area and Income Category	Income Projections, by Year				
	1985	1990	1995	2000	2005
State of Utah					
PCPI[a] ($)	8,932	9,736	10,631	11,568	12,585
Carbon County					
PCPI[a] ($)	10,182	10,612	10,525	11,568	12,585
Total Personal Income (10^3)	301,389	366,114	384,163	426,859	469,421
Duchesne County					
PCPI[a] ($)	8,485	9,249	10,099	10,990	11,956
Total Personal Income (10^3)	150,870	172,313	188,658	201,000	214,845
Emery County					
PCPI[a] ($)	8,932	9,736	10,631	11,568	12,585
Total Personal Income (10^3)	125,941	144,093	160,528	170,050	183,741
Garfield County					
PCPI[a] ($)	7,592	8,276	9,036	9,833	10,697
Total Personal Income (10^3)	32,646	38,070	43,373	49,165	55,624
Grand County					
PCPI[a] ($)	8,932	9,736	10,613	11,568	12,585
Total Personal Income (10^3)	69,670	80,322	89,786	96,361	106,973
Uintah County					
PCPI[a] ($)	8,932	9,736	10,631	11,568	12,585
Total Personal Income (10^3)	229,642	285,362	317,335	335,125	354,771
Wayne County					
PCPI[a] ($)	7,146	7,789	8,505	9,254	10,068
Total Personal Income (10^3)	15,007	17,915	22,113	24,986	29,197

[a]PCPI = per capita personal income.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

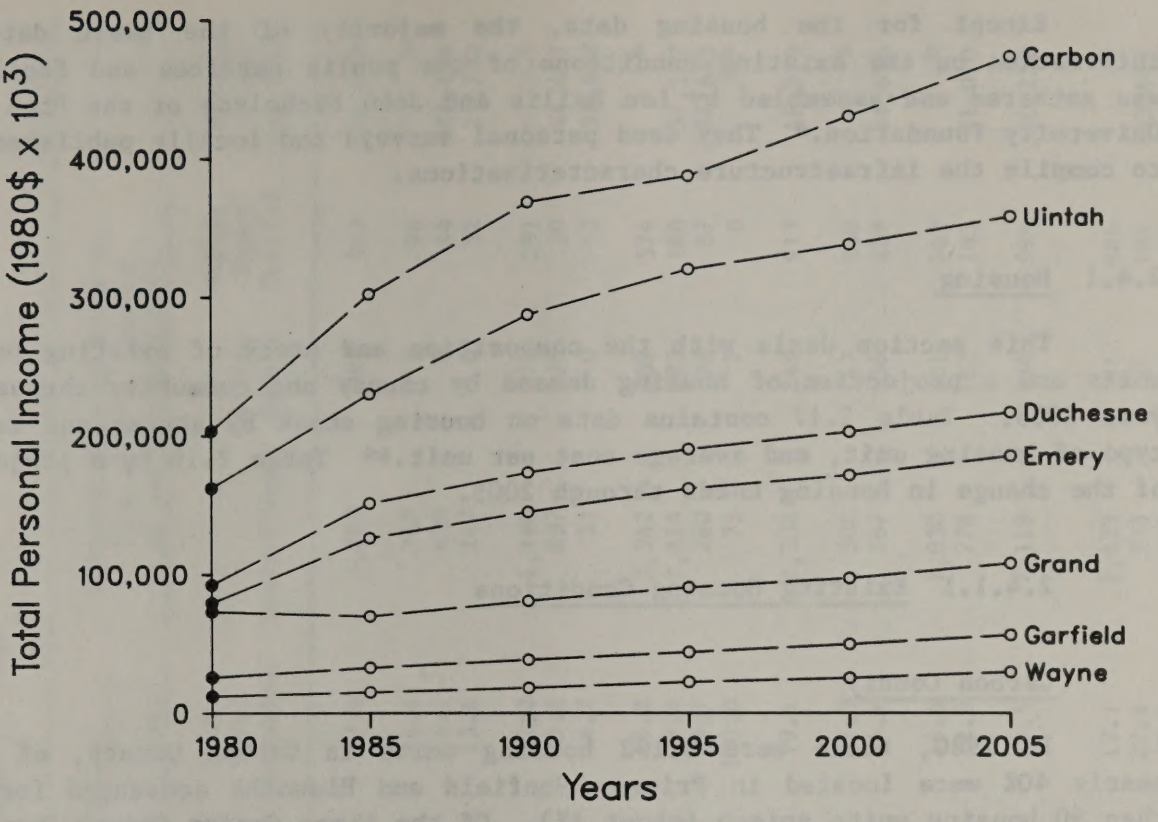

Fig. 2.20 Baseline Projection of Total Personal Income by County, 1985-2005

2.4 PUBLIC AND PRIVATE INFRASTRUCTURE

In addition to the baseline population and employment growth projected to occur in the counties of interest, there would also be some coinciding infrastructure effects. In this section, the public and private infrastructure requirements needed to satisfy the baseline population growth increment (i.e., baseline population projection by year minus 1980 population) are addressed. The county and community infrastructures considered (by subsection) include the following: housing (2.4.1), education (2.4.2), health care services (2.4.3), public safety (2.4.4), utilities (2.4.5), and other services (2.4.6).

In each subsection the following areas are addressed: existing stock and condition of the service or facility, and the projected demand for additional infrastructure as a result of the forecast growth in population. The demand projections are computed by using the *Community Facility Guidelines* of the State of Utah. These guidelines indicate standards that are to be used for the different types of services and facilities to determine the infrastructure impacts of future population growth. No attempt is made herein to determine the present infrastructure requirements or to assess the adequacy of the current provision of services.

Except for the housing data, the majority of the basic data and information on the existing conditions of the public services and facilities was gathered and assembled by Lee Nellis and John Nicholson of the Utah State University Foundation.* They used personal surveys and locally published data to compile the infrastructure characterizations.

2.4.1 Housing

This section deals with the composition and stock of existing housing units and a projection of housing demand by county and community through the year 2005. Table 2.17 contains data on housing stock by status and tenure, type of housing unit, and average cost per unit.** Table 2.18 is a projection of the change in housing needs through 2005.

2.4.1.1 Existing Housing Conditions

Carbon County

In 1980, there were 8,192 housing units in Carbon County, of which nearly 40% were located in Price. Scofield and Hiawatha accounted for less than 90 housing units apiece (about 1%). Of the three Census County Divisions (CCDs) in Carbon County, Price was easily the largest, containing 5,089 units. Of these, 3,202 were located in the city of Price, 433 in Wellington and 89 in Hiawatha. Helper CCD had 2,171 units, with 1,076 units in the city of Helper and 85 in Scofield. East Carbon CCD had 932 units in 1980: 722 in the city of East Carbon and 206 in Sunnyside.

The county as a whole had a vacancy rate of 6.7% in 1980. Sunnyside experienced the least vacancies — only 3.4% — and Scofield had far and away the most -- 29.4%. All other communities were within a 2% range of the countywide norm. Of these vacancies, 35% were being held for rent and 18% were held for sale. Only 43 units were vacant on a seasonal basis. Of these, over 60% were in Scofield, with no other community accounting for as much as 20%.

Nearly 75% of the occupied units in the county were conventional housing units. Price accounted for 40% of these units, and Scofield accounted for only 21 -- a mere 0.4%. Over 90% of the housing units in both Hiawatha and East Carbon were conventional units. Multifamily units comprised almost

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*Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

**The housing data not presented in the table but included in the descriptive analysis for each county were extracted from Summary Tape File 3A, 1980 Census of Population and Housing, U.S. Department of Commerce (1982).

Table 2.17 Composition and Stock of Existing Housing Units by County and Community, 1980

County/Community	Year-round Housing Stock by Status and Tenure: Total (No. of units)	Occupied (No. of units)	Vacancy Rate: No. of Units	Vacancy Rate: % of Total Stock	Renter Occupied: No. of Units	Renter Occupied: % of Total Occupied	Occupied Housing Stock by Type of Unit (number of year-round units): Conventional	Multi-Family	Mobile Home/ Trailer	Average Cost per Unit[a]
Carbon County	8,192	7,242	552	6.7	1,711	23.6	5,289	990	963	49,042
East Carbon CCD	932	874	46	4.9	129	14.8	767	9	98	-[b]
East Carbon	722	675	39	5.4	102	15.1	620	9	46	29,138
Sunnyside	206	199	7	3.4	27	13.6	147	0	52	24,720
Helper CCD	2,171	1,643	149	6.9	364	22.2	1,180	172	291	-[b]
Helper	1,076	993	81	7.5	250	25.2	837	126	30	44,437
Scofield	85	34	25	29.4	5	14.7	21	0	13	31,953
Price CCD	5,089	4,725	357	7.0	1,218	25.8	3,342	809	574	-[b]
Price	3,202	2,967	228	7.1	872	29.4	2,114	693	160	57,107
Wellington	433	396	37	8.5	78	19.7	280	29	87	46,643
Hiawatha	89	82	7	7.9	82	100.0	75	7	0	-[b]
Duchesne County	4,478	3,499	370	8.3	667	19.1	2,338	248	913	48,979
Duchesne CCD	1,343	805	149	11.1	221	27.5	508	47	250	-[b]
Duchesne City	574	492	82	14.3	168	34.1	267	36	189	44,626
Roosevelt CCD	2,954	2,694	221	7.5	446	16.6	1,830	201	663	-[b]
Roosevelt	1,222	1,133	89	7.3	255	22.5	778	162	193	51,010
Emery County	3,660	3,276	384	0.5	672	20.5	2,118	164	994	50,238
Castle Dale-Huntington CCD	2,474	2,200	236	9.5	421	19.1	1,423	91	686	-[b]
Castle Dale	626	542	80	12.8	124	22.9	333	24	185	53,669
Cleveland	156	147	9	5.8	15	10.2	110	0	37	41,775

Table 2.17 (Cont'd)

County/Community	Year-round Housing Stock by Status and Tenure: Total (No. of units)	Occupied (No. of units)	Vacancy Rate: No. of Units	Vacancy Rate: % of Total Stock	Renter Occupied: No. of Units	Renter Occupied: % of Total Occupied	Occupied Housing Stock by Type of Unit (number of year-round units): Conventional	Multi-Family	Mobile Home/ Trailer	Average Cost per Unit[a]
Emery County (Cont'd)										
Elmo	90	82	8	8.9	7	8.5	63	4	15	48,577
Huntington	773	698	59	7.6	158	22.6	353	43	302	51,420
Orangeville	399	367	30	7.5	63	17.2	297	9	61	53,917
Emery-Ferron CCD	800	712	87	10.9	150	21.1	488	55	169	-[b]
Emery	144	114	30	20.8	18	15.8	108	0	6	34,634
Ferron	538	489	49	9.1	115	23.5	293	52	144	58,242
Green River CCD	429	364	61	14.2	101	27.7	207	18	139	-[b]
Green River	390	335	53	13.6	96	28.7	191	18	126	39,350
Garfield County	1,770	1,196	254	14.4	208	17.4	956	63	177	39,487
Escalante CCD	430	295	64	14.9	61	20.7	230	25	40	-[b]
Boulder	71	38	14	19.7	13	34.2	19	12	7	40,625
Escalante	300	236	45	15.0	42	17.8	197	11	28	38,672
Grand County	3,046	2,759	259	8.5	620	22.5	1,529	286	944	54,201
Thompson CCD	136	117	12	8.8	53	45.3	50	15	52	-[b]

Table 2.17 (Cont'd)

County/Community	Year-round Housing Stock by Status and Tenure						Occupied Housing Stock by Type of Unit (number of year-round units)			
			Vacancy Rate		Renter Occupied					
	Total (No. of units)	Occupied (No. of units)	No. of Units	% of Total Stock	No. of Units	% of Total Occupied	Conventional	Multi-Family	Mobile Home/ Trailer	Average Cost per Unit[a]
Uintah County	6,621	5,949	613	9.3	1,254	21.1	4,355	504	1,090	53,086
Uintah-Ouray CCD	1,251	1,065	159	12.7	226	21.2	823	40	202	-[b]
Ballard	172	157	13	7.6	18	11.5	127	0	30	47,339
Vernal CCD	5,370	4,884	454	8.5	1,028	21.0	3,532	464	888	-[b]
Vernal	2,399	2,187	206	8.6	686	31.4	1,496	370	321	52,541
Wayne County	848	615	174	20.5	104	16.9	521	16	78	41,839
Hanksville CCD	151	93	31	20.5	21	22.6	53	4	36	-[b]

[a]Mean value of owner-occupied noncondominium housing units.

[b]Not available.

Source: adapted from U.S. Department of Commerce, *1980 Census of Population and Housing*, Summary Tape File 3A (1982).

14% of the housing units within the county. Price accounted for 70% of the total, whereas none of the 199 occupied units in Sunnyside were multifamily units. Mobile homes and trailers also accounted for over 13% of the occupied housing units. The greatest concentration was found in Scofield, where over 38% of the housing units were mobile homes or trailers. None of the 82 units in Hiawatha were mobile homes or trailers.

Countywide, 23.6% of the occupied units were occupied by renters. In Hiawatha, all 82 units were rented. In Sunnyside, Scofield, and East Carbon, less than one-sixth of the units were rented. Of these rented units, 47% were single family units. Only in Price is there a greater percentage of multi-family rental units than single family rented units.

Of the occupied units existing in 1980, over 56% had been constructed before 1950. In East Carbon and Hiawatha, over 90% of the occupied units were constructed before 1950. In Price and Wellington, almost 5% of the occupied units had been constructed between 1979 and March 1980.

The average cost per unit countywide is $49,042. This value ranges considerably by community: Sunnyside ($24,720) and East Carbon ($29,138) on the low end to Price ($57,107) on the high.

Finally, 48% of the homeowners countywide moved into their present home since 1975. In Hiawatha this figure was 84%. In Price, Helper, and East Carbon, over 20% of the homeowners moved into their present home before 1960.

Duchesne County

There were 4,478 housing units in Duchesne County in 1980. Roosevelt CCD contained 2,954 units in 1980; 1,222 of these were in Roosevelt. Duchesne CCD had 1,343 units, of which 574 were located in the city of Duchesne. The city of Duchesne had a 14.3% vacancy rate, while the 7.3% vacancy rate in Roosevelt was one percentage point below the county average. Of these vacancies, 45% were being held for rent, and 18% were being held for sale. There were no units in either Duchesne City or Roosevelt that were vacant on a seasonal basis.

Nearly 70% of the occupied units in Roosevelt were conventional housing units, just above the county average of 68%. In the city of Duchesne, the rate was only 54%. Multifamily units accounted for only 7.1% of the housing in the county, with Roosevelt containing over 65% of these. Over 20% of the housing units in the county were mobile homes or trailers.

Renters occupied 19.1% of the housing units in the county, with Duchesne having a concentration of 34.1%. Only 30% of these rental units were single family units, and 15% were occupied by five or more families.

Of the occupied units existing in 1980, 48% were constructed after 1970; 25% were constructed before 1950.

The average cost per unit countywide was $48,979. In the city of Duchesne it was $44,626; in Roosevelt it was $51,010.

Over 50% of the homeowners in the county had moved into their current home since 1975.

Emery County

A total of 3,660 housing units existed in Emery County in 1980. No one community accounted for more than 22% of the housing units; Huntington had the most with 773. Elmo, with 90, contributed the least to the county total. The Castle Dale-Huntington CCD was clearly the area with the largest number of housing units; with 2,474 units it had three times more than any other CCD in Emery County. Huntington, with 773 units, and Castle Dale, with 626 units, were the largest communities in the CCD. The Emery-Ferron CCD contained 800 units in 1980 — 538 in Ferron and 144 in Emery. Green River was the smallest CCD in the county with 429 units. Of these, 390 were located in the city of Green River.

The county vacancy rate was 10.5%. Emery at 20.8% and Castle Dale at 12.8% were the only two communities above the norm. Almost 34% of the vacant units were being held for rent, and 17% were being held for sale. Only 22 units in the county were vacant on a seasonal basis. Of these, 16 were located in Huntington.

Of the 3,276 occupied units in the county, 65% were conventional housing units. In the city of Emery, 95% of the units were conventional housing units, compared to only 51% in Huntington. Multifamily units comprised only 5% of all housing units. Cleveland and Emery each had zero; Elmo and Orangeville also had less than 10 apiece. The greatest concentration was in Ferron, where multifamily units accounted for nearly 11% of the occupied units. Over 30% of the occupied units in the county were mobile homes or trailers. Concentrations of these units ranged from 5% in Emery to over 43% in Huntington.

Over 20% of the occupied housing units were the residence of renters. Elmo had 8.5% renters and Cleveland 10.8% renters. All other communities in the county had over 15%. Of the rented units, 44% were single family houses. Only 11% were for three or more families.

Of the occupied units existing in 1980, over 54% had been built since 1970. Also, 23% had been built before 1940.

The average cost per unit countywide in 1980 was $50,238. Ferron, at $58,242, had the highest average while Emery was markedly below the norm at $34,634.

Over 64% of the homeowners had moved into their current unit since 1975. This is a dramatic change for only a five year period. This figure was 73% in both Ferron and Castle Dale. In the city of Emery, however, over 31% of the homeowners had been in the same unit since 1949 or before. Emery was also the only community studied where over half of the homeowners had lived in the same unit since before 1970.

Garfield County

There were 1,770 housing units existing in Garfield County in 1980. Escalante CCD accounted for 430 of these, with 300 in the city of Escalante and 71 in Boulder. Both Boulder (19.7%) and Escalante (15.0%) had vacancy rates higher than the county average of 14.4%. Only 36% of these vacancies were being held for sale or rent; almost 33% were held for occasional use. In these two communities 38 units are vacant on a seasonal basis, with nearly half of these being single family units.

Of the occupied units in the county, 80% were conventional housing units. In Boulder, this figure is only 50%. There was a 32% concentration of multifamily units in Boulder, compared to the county average of 5.2%. Mobile homes and trailers accounted for 15% of the occupied units in the county. The concentrations in Boulder and Escalante nearly equaled this figure.

In 1980, 17.4% of the occupied units in Garfield County were occupied by renters. This figure was much higher in Boulder, where the rate was 34.2%. Of the rented units in Boulder and Escalante, 69% were single family units.

Of all the occupied units existing in Boulder and Escalante in 1980, 54% had been constructed before 1950. In Escalante, over 46% had been constructed before 1940. Only 16% of the units in these two communities had been constructed since 1975.

The average cost per unit countywide was $39,487, with each of the communities discussed falling within $1,200 of the norm.

In these two communities, 45% of the homeowners had moved into their present unit since 1975; also, 21% had been in the same unit since before 1950.

Grand County

There were 3,046 units existing in Grand County in 1980. Of these, 136 were located in Thompson CCD. The Thompson CCD vacancy rate of 8.8% was slightly above the county average of 8.5%. Over 83% of these vacancies were being held for sale or rent. Only seven units in the Thompson CCD were vacant on a seasonal basis. The average cost per unit in the county in 1980 was $54,201.

Conventional housing units made up 50% of the occupied units in Grand County. This figure was only 37% in the Thompson CCD, where mobile homes and trailers accounted for 44% of the housing. Multifamily housing made up 10% of the occupied units in the Thompson CCD. This figure was identical to the county figure.

Renters occupied 22.5% of the occupied units in the county in 1980. In the Thompson CCD this figure was 45.3%. Only half of these were single family units.

Of the occupied units existing in the Thompson CCD in 1980, 47% had been built after 1975. None of the occupied units were constructed from 1979 to March of 1980. Likewise, none of the units occupied in 1980 had been constructed in the 1950s. Over 68% of the homeowners in the Thompson CCD had moved into their current units since 1975.

Uintah County

In 1980, 6,621 housing units existed in Uintah County. Of these, 5,370 were located in the Vernal CCD, including 2,399 in the city of Vernal. The Uintah-Ouray CCD had 1,251 units in 1980, including 172 in Ballard. County-wide, there was a 9.3% vacancy rate. Ballard at 7.6% and Vernal at 8.6% were both below the norm. Over 65% of these vacant units were being held for sale or rent; less than 4% were held for occasional use. In Ballard and Vernal only eight units were seasonally vacant.

Seventy-three percent of the occupied housing units in 1980 were conventional housing units. The figure for Ballard was slightly higher at 81%; Vernal was lower at 68%. In the county, multifamily units accounted for 8.5% of the occupied units. In Vernal, this figure was 17%, while in Ballard, none of the 157 units were multifamily units. These two communities both had approximately the same value as the county average (18.3%) for mobile homes and trailers.

Renters occupied 21.1% of the occupied units in 1980. Vernal had 31.4% renters; Ballard had only 11.5%. Of these rented units 41.3% were single family units. In Vernal, 37.3% of the rented units were for three or more families.

Thirty percent of the occupied housing units in 1980 had been constructed since 1970. In Ballard, over 36% of the units were constructed in the four year period from 1975-1978.

The average cost per unit in the county was $53,086. Both Ballard ($47,339) and Vernal ($52,541) fell slightly below this norm.

In these two communities, over 65% of the homeowners had moved into their present home since 1975. In Vernal, over 35% had moved in since 1979. Only 5.8% had moved in before 1950.

Wayne County

In 1980, Wayne County contained 848 housing units; 151 of these were located in the Hanksville CCD. The Hanksville vacancy rate of 20.5% was the same as the countywide rate. In the Hanksville CCD, 71% of the vacancies were being held for sale or rent. There were 27 units vacant on a seasonal basis in the Hanksville CCD.

Of the occupied units in the county, 85% were conventional housing units. The figure for Hanksville CCD was 57%. Only 16 of the 615 occupied units in the county were multifamily units; four of these were in the Hanksville CCD. Mobile homes and trailers accounted for 39% of the occupied housing in the Hanksville CCD, compared to the county average of 12.7%.

Renters occupied 22.6% of the housing in the Hanksville CCD, but only 16.9% countywide. Over half of the rented units in Hanksville CCD were single family units.

One third of the occupied units in Hanksville CCD were constructed since 1975. The average cost per unit was $41,839 for the county in 1980. Over 72% of the homeowners in the Hanksville CCD had moved into their present homes since 1975. Only 12% had been in the same unit since 1959.

2.4.1.2 Baseline Projections of Housing Demand

The baseline projections for housing by county and community between 1985 and 2005 are presented in Table 2.18. These projections represent the change in housing demand for this area due to baseline population and household growth during this period.

Table 2.18 indicates that there would be a dramatic increase in housing demands between 1985 and 2005. The greatest overall increase is projected to occur in Wayne and Garfield counties, where total housing demands would increase 406% and 134%, respectively. Carbon County would also experience a substantial increase, as housing demand in 2005 will be 104% greater than in 1985. Duchesne and Emery counties are expected to experience a relatively smaller increase in housing demands, with increases of 13.1% and 10.1%, respectively. Nevertheless, all counties would have a need for more housing in 2005 than in 1985.

Some communities, however, are projected to realize a net decline in housing demand over the period. Five communities or CCDs studied would have such a decline: Emery-Ferron CCD (-50%), Emery (-47%), Duchesne City (-30%), Ferron (-23%), and Huntington (-13%). There are also 11 communities or CCDs which, due to decreasing populations, are expected to have excess housing stock throughout the period studied. These communities are identified in footnote d of Table 2.18. It is interesting to note that although there is forecast to be excess housing in the Helper CCD throughout the period, both of

Table 2.18 Change in Housing Demand by County and Community Resulting from the Baseline Household Projections[a,b,c] (1985-2005)

County/Community	Change in Housing Demand, by Year and Type														Percent Change 1985-2005		
	1985			1990			1995			2000			2005					
	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes
Carbon County	1,290	323	538	2,126	532	886	2,396	599	998	2,528	632	1,053	2,636	659	1,098	104.3	104.0	104.1
East Carbon CCD	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA
East Carbon	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA
Sunnyside	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA
Helper CCD	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA
Helper	86	22	36	153	38	64	165	42	69	175	44	73	189	48	79	119.2	118.2	119.4
Scofield	3	1	2	6	2	3	7	2	3	8	2	3	8	2	4	166.7	100.0	100.0
Price CCD	1,096	274	457	1,915	479	1,048	2,179	545	908	2,321	581	967	2,418	605	1,008	120.6	120.8	120.6
Hiawatha	-d	-d	-d	4	1	2	2	1	1	3	1	1	3	1	2	-e	-e	-e
Price	745	187	311	1,272	318	530	1,477	370	616	1,610	403	671	1,671	418	697	124.3	123.5	124.1
Wellington	162	41	68	243	61	102	270	68	113	284	71	118	293	74	122	80.9	80.5	79.4
Duchesne County	1,007	252	420	1,072	268	447	1,055	264	439	1,088	273	454	1,139	285	475	13.1	13.1	13.1
Duchesne CCD	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA
Duchesne City	133	34	56	70	18	29	77	20	32	86	22	36	93	24	39	-30.1	-29.4	-30.4
Roosevelt CCD	659	165	275	831	208	347	800	200	334	818	205	341	858	215	358	30.2	30.3	30.2
Roosevelt	264	66	110	333	84	139	320	82	134	327	82	137	344	86	143	30.3	30.3	30.0
Emery County	382	96	159	448	112	187	472	118	197	448	112	187	412	103	172	7.9	7.3	8.2
Castle Dale-Huntington CCD	144	36	60	227	57	95	237	60	99	206	52	86	191	48	80	32.6	33.3	33.3
Castle Dale	114	29	48	149	37	62	160	40	67	151	38	63	147	37	61	28.9	27.6	27.1
Cleveland	6	2	3	11	3	5	11	3	5	9	3	4	9	3	4	50.0	50.0	33.3
Elmo	6	2	3	9	3	4	9	3	4	8	2	4	8	2	3	33.3	0	0
Huntington	48	12	20	60	15	25	55	14	23	46	12	19	42	11	18	-12.5	-8.3	-10.0
Orangeville	88	22	37	104	26	43	106	27	44	100	25	42	97	25	41	10.2	13.6	10.8
Emery-Ferron CCD	76	19	32	45	12	19	50	13	21	42	11	18	38	10	16	-50.0	-47.4	-50.0
Emery	9	3	4	5	2	2	6	2	3	6	2	3	5	2	2	-44.4	-33.3	-50.0
Ferron	87	22	37	68	17	29	73	19	31	70	18	29	67	17	28	-23.0	-22.7	-24.3
Green River CCD	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA
Green River	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	-d	NA	NA	NA

Table 2.18 (Cont'd)

County/Community	Change in Housing Demand, by Year and Type															Percent Change 1985-2005		
	1985			1990			1995			2000			2005					
	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes
Garfield County	139	35	58	199	50	83	241	61	101	277	70	116	319	80	133	129.5	128.6	129.3
Escalante CCD	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	NA	NA	NA
Boulder	2	1	1	3	1	1	3	1	2	3	1	2	3	1	2	50.0	0	100.0
Escalante	24	6	10	26	7	11	30	8	13	30	8	13	31	8	13	29.2	33.3	30.0
Grand County	–[d]	–[d]	–[d]	11	3	5	47	12	20	11	3	5	59	15	25	–[e]	–[e]	–[e]
Thompson CCD	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	–[d]	NA	NA	NA
Uintah County	1,014	254	423	1,512	378	630	1,560	390	650	1,566	392	653	1,608	402	670	58.6	58.3	58.4
Uintah-Ouray CCD	148	37	62	235	59	98	232	58	97	234	59	98	240	60	100	62.2	62.2	61.3
Ballard	57	14	24	86	22	36	87	22	36	83	21	35	84	21	35	47.4	50.0	45.8
Vernal CCD	444	111	185	861	216	359	913	229	381	921	231	384	945	237	394	112.8	113.5	113.0
Vernal	326	82	136	590	148	246	626	157	261	613	154	256	624	156	260	91.4	90.2	91.2
Wayne County	38	10	16	80	20	30	122	31	51	164	41	68	194	49	81	410.5	390.0	406.3
Hanksville CCD	15	4	7	26	7	11	35	9	15	44	11	18	52	13	22	246.7	225.0	214.3

[a]It is assumed that each household requires a housing unit, thereby resulting in a one-to-one correspondence between the household projections generated by the UPED model and housing demand.

[b]Totals may not add due to rounding.

[c]Census County Division (CCD).

[d]Population projections indicate a decline in future population levels. Consequently, existing housing units should become available in future time periods. The following 1980 to 2005 housing availability is expected: East Carbon CCD - 268 to 520; East Carbon - 127 to 377; Sunnyside - 27 to 87; Helper CCD - 291 to 2; Hiawatha - 2 in 1985; Duchesne CCD - 135 to 248; Green River CCD - 158 to 110; Green River - 158 to 117; Escalante CCD - 116 to 103; Grand County - 172 in 1985; and Thompson CCD - 27 to 11.

[e]Undefined.

the communities analyzed in this CCD -- Helper and Scofield -- are expected to realize a significant increase in housing demand over the period studied.

Several communities and CCDs are projected to have dramatic increases in housing demand over this period. Most notably, demand would increase by 244% in the Hanksville CCD, by 124% in the city of Price, and by 120% in the city of Helper. (It should be noted, however, that even though demand in Price is projected to increase at a slower rate than in the Hanksville CCD, there would be a need for 2,785 more housing units by 2005 in Price, but only 86 more in the Hanksville CCD.)

Throughout the counties, housing demand is forecast to increase more rapidly between 1985 and 1995, than between 1995 and 2005. Demand for housing in Wayne County would increase at a 12.56% annual rate from 1985 to 1995. Housing demand in Garfield and Carbon counties would also increase substantially in this period, at annual rates of 5.73% and 6.36%, respectively.

In the period from 1995 to 2005, all counties except Emery are expected to maintain their demand for additional housing, but at a much slower rate. Emery County is projected to have a 1.22% annual decline in demand over this 10 year period. The greatest increase in housing demand is again seen in Wayne County, where the annual rate of increase is projected to be 4.48%. Baseline housing demand in both Garfield and Carbon counties is projected to drop substantially, to an annual rate of 2.97% and 0.98%, respectively.

Like the countywide trend, most communities are projected to have greater increases in housing demand in the period from 1985 to 1995 than from 1995 to 2005. The most notable yearly increases are expected in Price (7.09% annually), Helper (6.76% annually), and Vernal (6.73% annually). Other communities would experience greater rates of increased demand, but their low volume does not warrant mention. Only three communities are expected to have a decrease in baseline demand for housing over this period. With their annual rates they are: Duchesne (-5.31%), Emery (-3.97%), and Ferron (-1.79%).

In the period from 1995 to 2005 most areas are projected to have a reduction in baseline housing demands compared to the earlier period. Those communities that are still projected to have an increase in housing demand do so at a much reduced rate. Annual baseline demand in Price drops from 7.09% to 1.24% between 1995 and 2005; in Helper it drops from 6.76% to 1.34%; and in Vernal it drops from 6.73% to -0.02%. Although it does not have a significant housing demand, Hanksville CCD is projected to have continued annual growth: 8.78% from 1985-1995 and 4.02% from 1995-2005. There is one notable exception to the regionwide trend. Demand in the city of Duchesne is forecast to decrease at a rate of 5.31% annually from 1985-1995, but would increase at a rate of 1.87% annually from 1995-2005.

It is projected that all counties except Grand would require new housing construction, when 1985 housing demand is compared to the present housing stock. This additional demand would range from 37% in Duchesne County

to 7.5% in Wayne County. Grand County is expected to have an excess of 172 units in 1985.

2.4.2 Education

This section describes the current enrollment and staffing conditions in each county school district, and the expected demand for additional teachers and school facilities due to the baseline population projections identified in Sec. 2.2.2. The enrollment, school capacity, percent of capacity currently being used, number of teachers, and student/teacher ratio are presented in Table 2.19 for each school and for the county as a whole. Each school district is further described below. A description of the fiscal conditions of each school district is presented in Sec. 2.5.

2.4.2.1 Existing Conditions in the County School Districts

Carbon County School District

In 1982, 5,245 students were enrolled in the 11 schools in Carbon County. Carbon High School in Price had the largest enrollment with 787 students, while Helper Junior High School in Helper had the smallest enrollment with 270. The six schools in Price accounted for over 65% of the total enrollment in the school district.

The total 1982 capacity of the schools in the county was 5,549. With one exception, the schools in Price had a larger capacity than any of the other schools in the district. Price Elementary School and Reeves Elementary School, both in Price, had the largest and smallest capacities in the county, respectively.

The 11 schools in the district had an average operating capacity of almost 95% in 1982. Five schools — led by Reeves Elementary School at 137% -- had enrollments greater than their stated capacity. To accommodate this condition, the district makes extensive use of portable classrooms.

Carbon County employed 217 teachers in 1982; this translates into a 24:1 student/teacher ratio. East Carbon High School in Carbon had the lowest ratio (14:1), while Wellington Elementary School in Wellington had the highest ratio (33:1). The district student/teacher ratio of 24:1 is slightly greater than the state average of 23:1.

Carbon County approved a $16 million bond for school construction and improvements in 1982. The state estimates that the county would need to invest over $10 million in schools by 1987, but does not indicate how many additional funds would be needed through 1995. The 1982 bond issue exhausted the legal debt capacity of the school district.

Table 2.19 Current Enrollment, Capacity, and Staffing Statistics of Schools by County School District, 1982

District/School	Location	Enrollment	Present Capacity	Percent of Capacity	Teachers	Student/ Teacher Ratio
Carbon County School District		5,245	5,549	94.5	217	24:1
Castle Heights Elementary	Price	595	559	106.4	19	31:1
Durrant Elementary	Price	507	592	85.6	18	28:1
Price Elementary	Price	549	817	67.2	21	26:1
Reeves Elementary	Price	324	236	137.3	14	23:1
Mont Harmon Junior High	Price	712	764	93.2	30	24:1
Carbon High School	Price	787	716	109.9	38	21:1
Sally Manto Elementary	Helper	500	464	107.8	19	26:1
Helper Junior High	Helper	270	339	79.6	14	19:1
Petersen Elementary	Sunnyside	352	394	89.3	15	23:1
East Carbon High School	Sunnyside	222	343	64.7	16	14:1
Wellington Elementary	Wellington	427	325	131.4	13	33:1
Duchesne County School District		4,247	4,886	86.9	184.5	23:1
Altamont Elementary	Altamont	391	332	117.8	15	26:1
Altamont High School	Altamont	250	289	86.5	14	18:1
Duchesne Elementary	Duchesne	486	375	129.6	19	26:1
Duchesne High School	Duchesne	330	416	79.3	17	19:1
Myton Elementary	Myton	246	569	43.2	9.5	26:1
Neola Elementary	Neola	275	435	63.2	9.5	29:1
East Elementary	Roosevelt	678	527	128.7	26.5	26:1
Roosevelt Elementary	Roosevelt	348	367	94.8	14.5	24:1
Roosevelt Junior High	Roosevelt	475	520	91.3	22.5	21:1
Union High School	Roosevelt	573	401	142.9	27	21:1
Tabiona Elementary	Tabiona	111	655	29.8	5	22:1
Tabiona High School	Tabiona	84			5	17:1
Emery County School District		3,281	4,347	75.5	147	22:1
Castle Dale Elementary	Castle Dale	442	492	89.8	18	25:1
Emery County High School	Castle Dale	476	1,012	47.0	26	18:1
Cleveland Elementary	Cleveland	327	366	89.3	12	27:1
Ferron Elementary	Ferron	556	494	112.6	18	31:1
San Rafael Junior High	Ferron	350	403	86.8	16	22:1
Book Cliff Elementary	Green River	161	161	100.0	8	20:1
Green River High School	Green River	134	342	39.2	11	12:1
Huntington Elementary	Huntington	548	674	81.3	21	26:1
Canyon View Junior High	Huntington	287	403	71.2	17	17:1
Garfield County School District		982	1,287	76.3	63	16:1
Antimony Elementary	Antimony	12	41	29.3	1	12:1
Bryce Valley School	Tropic	236	420	56.2	14	17:1
Escalante Elementary	Escalante	107	137	78.1	5	21:1
Escalante High School	Escalante	64	159	40.3	6	11:1
Panguitch Elementary	Panguitch	234	228	102.6	10	23:1
Panguitch High School	Panguitch	226	255	88.6	22	10:1
Ticaboo School	Ticaboo	103	47	219.1	5	21:1
Grand County School District		1,784	1,667	107.0	80	22:1
Helen M. Knight Elementary	Moab	407	373	109.1	16.5	25:1
Southeast Elementary	Moab	477	520	91.7	17.5	27:1
Grand County Middle School	Moab	429	353	121.5	20	21:1
Grand High School	Moab	455	410	111.0	25	18:1
Sundwall Center	Moab	16	11	145.5	1	16:1

Table 2.19 (Cont'd)

District/School	Location	Enrollment	Present Capacity	Percent of Capacity	Teachers	Student/ Teacher Ratio
Uintah County School District		6,478	6,143	105.5	222.5	29:1
Ashley Elementary	Vernal	546	503	108.5	18	30:1
Central Elementary	Vernal	465	439	105.9	14.5	32:1
Discovery Elementary	Vernal	654	587	111.4	20	33:1
Northwest Elementary[a]	Vernal	-	694	-	-	-
Southeast Elementary[a]	Vernal	-	694	-	-	-
Vernal Junior High	Vernal	1,662	959	173.3	44	38:1
Uintah High School	Vernal	857	922	93.0	38	23:1
Uintah Learning Center	Vernal	83	67	123.9	7	12:1
Maeser Elementary	Maeser	609	387	157.4	20	30:1
Naples Elementary	Naples	652	374	174.3	20	33:1
Todd Elementary	Western Uintah County	724	283	255.8	26	28:1
West Junior High	Western Uintah County	226	234	96.6	15	15:1
Wayne County School District		555	592	93.8	32.5	17:1
Hanksville Elementary	Hanksville	52	82	63.4	3.5	15:1
Loa Elementary	Loa	239	239	100.0	12	20:1
Wayne Middle School[b]	Bicknell	119	-	-	7	21:1
Wayne High School	Bicknell	145	271	53.5	10	15:1

[a]Scheduled to open in 1983.

[b]Building has been condemned; nominal capacity is 271 but actual capacity is zero.

Source: tabulated from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Duchesne County School District

A total of 4,247 students were enrolled in Duchesne County schools in 1982. School enrollment ranged from 84 at Tabiona High School in Tabiona to 678 at East Elementary School in Roosevelt. The four schools in Roosevelt had a total of 2,047 students. The other eight schools in the county accounted for the other 2,200 students (52%).

The total capacity of the schools in the county was 4,886 in 1982. Altamont High School in Altamont had a capacity of 289 students, the lowest in the district. The school building in Tabiona, serving both the high school and the elementary school, had the greatest district capacity — 655.

The schools in Duchesne County varied considerably in terms of their percent of operating capacity. In 1982, the school building in Tabiona was at 29.8% of capacity, and the elementary school in Myton was at 43.2% of capacity. Conversely, two schools in Roosevelt and one school in Duchesne were operating at over 125% of capacity. The schools in the district as a whole were operating at 87% of capacity.

The district employed 184.5 teachers in 1982. The student/teacher ratio of 23:1 was the same as the ratio for the state.

Duchesne County has been devoting $2 million annually to capital facilities. The state has estimated that the county would need to spend slightly more than $20 million for school construction between 1982 and 1987.

Emery County School District

Enrollment in Emery County schools totaled 3,281 in 1982. Ferron Elementary School in Ferron had the largest enrollment (556), while Book Cliff Elementary in Green River had the smallest enrollment (161). Castle Dale, Ferron, and Huntington, each of which have two schools, had about 80% of the total enrollment in the district.

The 11 schools in the district had a combined capacity of 4,347 students. The capacities of the schools ranged from 161 at Book Cliff Elementary to 1,012 at Emery County High School in Castle Dale.

Only one school in the district — Ferron Elementary School — had an enrollment that exceeded its capacity in 1982. The schools throughout the district were operating at slightly over 75% of capacity. Some portable classrooms are used, but most of the schools could accommodate another 100 students.

The district employed 147 teachers in 1982. The student/teacher ratio for the district was 22:1, just below the state ratio (23:1). Ferron Elementary had a student/teacher ratio of 31:1, the highest in the district, while Green River High School had the lowest ratio of 12:1.

The county recently completed a building program that doubled the capacity of the schools. Over $30 million in bonding capacity remains; the state estimates the district would need to spend over $18 million by 1987 to accommodate expected growth. Based on the 1980 age distribution, the school-age population would increase rapidly in coming years (see Fig 2.12).

Garfield County School District

The seven schools in Garfield County had a total of 982 students in 1982. All of the schools are relatively small: the highest enrollment was only 236 at Bryce Valley School in Tropic, while two schools had less than 100 students.

The capacity of the schools was 1,287 students in 1982. Again, the largest school -- Bryce Valley School — had a capacity of only 420. Ticaboo School and Antimony Elementary were the smallest schools having capacities of 47 and 41, respectively.

Most of the schools in the district were operating at well under their stated capacities. The most striking exception was the Ticaboo School, which

was operating at 219% of capacity. The seven district schools together had an average operating capacity of 75%.

Garfield County employed 63 teachers in 1982. The highest student/teacher ratio in the county was 23:1, the same as the state average. The student/teacher ratio in the school district was substantially lower -- 16:1.

The Garfield school district has an ambitious building program that is intended to give it all new buildings in 10 years, at a cost of $6 million. The distribution of school-age population (Fig. 2.13) indicates that the number of junior high and high school students would increase substantially in the near future. Several temporary measures have been proposed to reduce the overcrowding in the Ticaboo School and to increase the capacity of the high schools in the district.

Grand County School District

In 1982, 1,784 students were enrolled in the five schools in Grand County. Four of the schools had between 400 and 500 students, while the Sundwall Center had an enrollment of 16.

The combined capacity of the schools in 1982 was 1,667. The capacities of the schools ranged from 11 at the Sundwall Center to 520 at Southeast Elementary.

Only one school, Southeast Elementary, was operating under its capacity in 1982. The Sundwall Center was operating at 146% of capacity and Grand County Middle School was operating at 122% of capacity. The five schools together had an average operating capacity of 107%.

Grand County employed 80 teachers in 1982. The student/teacher ratio in the county was 22:1, just below the state ratio of 23:1. The student/teacher ratios ranged from 16:1 at the Sundwall Center to 27:1 at the Southeast Elementary School in Moab.

The large number of children aged 0 to 5 (Fig. 2.14) indicates that elementary school enrollment would increase substantially in coming years. An extensive remodeling program that is under way in the county would help alleviate the current overcrowding in the schools.

Uintah County School District

A total of 6,478 students attended Uintah County schools in 1982. Enrollment ranged from 83 at the Uintah Learning Center in Vernal to 1,662 at Vernal Junior High School. Six of the 10 operating schools and about two-thirds of the students were in Vernal.

The capacity of the schools in the district was 6,143. This total includes two elementary schools in Vernal scheduled to open in 1983. The

junior high school and senior high school in Vernal each have a capacity of over 900, while the Learning Center had a capacity of 67.

Even including the two new schools in Vernal, the average operating capacity in the school district was 106% in 1982. Only two schools were operating at less than 100% of capacity, while Todd Elementary School in western Uintah County was operating at 256% of capacity. Three other schools were operating at over 150% of capacity.

In 1982, the district employed 222.5 teachers. The student/teacher ratio for the district was 29:1, well above the state ratio of 23:1. Uintah Learning Center had a student/teacher ratio of 12:1, but Vernal Junior High School had a student/teacher ratio of 38:1.

In addition to the two elementary schools scheduled to open in 1983, Uintah County has plans to open another elementary school, a junior high school, and a high school in the 1984-85 school year. Funding for this construction exceeds county resources, so industry contributions are being sought.

Wayne County School District

The four schools in Wayne County had a combined enrollment of 555 in 1982. Loa Elementary, with 239 students, had the largest enrollment, while Hanksville Elementary had the smallest enrollment with 52 students.

The combined capacity of the schools was 592 in 1982. This does not include the Wayne Middle School building in Bicknell, which has a stated capacity of 271 but has been condemned. Including the enrollment but not the capacity of the Wayne Middle School, the schools in the district were operating at 94% of capacity in 1982. The excess capacity of the Wayne High School in Bicknell exceeded the enrollment of the Wayne Middle School.

Wayne County employed 32.5 teachers in 1982. The student/teacher ratio for the district was 17:1, well under the state ratio of 23:1. No school deviated from the district ratio by more than four students per teacher.

The district has $3.3 million available for school improvements over the next three years. The state has estimated the needs of the district through 1987 at $730,000. The school-age population distribution (Fig. 2.16) reveals that school enrollment should increase slightly in the next several years.

2.4.2.2 Baseline Projection of Education Services

The baseline projection of additional education services by county, between 1985 and 2005, is presented in Table 2.20. The projected number of

Table 2.20 Change in Education Service Demands by County and Year Resulting from the Baseline Population Projections[a]

County/ Service Demand	Additional Service Demands, by Year					Average Annual Compound Percent Change		Percent Change
	1985	1990	1995	2000	2005	1985-1995	1995-2005	1985-2005
Carbon County								
Students	1,924	3,824	4,824	4,624	4,724	9.63	-0.21	145.5
Classrooms	77	153	193	185	189	9.62	-0.21	145.5
Teachers	77	153	193	185	189	9.62	-0.21	145.5
Duchesne County								
Students	1,254	1,924	2,244	1,824	1,724	5.99	-2.60	37.5
Classrooms	51	77	90	73	69	5.84	-2.62	35.3
Teachers	51	77	90	73	69	5.84	-2.62	35.3
Emery County								
Students	816	1,416	1,716	1,516	1,516	7.72	-1.23	85.8
Classrooms	33	57	69	61	61	7.65	-1.22	84.8
Teachers	33	57	69	61	61	7.65	-1.22	84.8
Garfield County								
Students	128	328	428	528	628	12.83	3.91	390.6
Classrooms	6	14	18	22	26	11.61	3.75	333.3
Teachers	6	14	18	22	26	11.61	3.75	333.3
Grand County								
Students	99	479	599	479	529	19.72	-1.24	434.3
Classrooms	4	20	24	20	22	19.62	-0.87	450.0
Teachers	4	20	24	20	22	19.62	-0.87	450.0
Uintah County								
Students	1,400	3,010	3,770	3,020	2,790	10.41	-2.97	99.3
Classrooms	56	121	151	121	112	10.43	-2.94	100.0
Teachers	56	121	151	121	112	10.43	-2.94	100.0
Wayne County								
Students	48	98	158	198	238	12.65	4.18	395.8
Classrooms	2	4	7	8	10	13.35	3.63	400.0
Teachers	2	4	7	8	10	13.35	3.63	400.0

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

students was computed by the UPED model based on changes in the general population between 1985 and 2005. The numbers of teachers and classrooms were subsequently derived from the projected number of students.*

Table 2.20 indicates that the demand for educational services is projected to increase substantially between 1985 and 2005. The largest increases would occur in Grand, Garfield and Wayne counties, where the number of students is forecast to increase by 434%, 391%, and 396%, respectively. Duchesne County would have the smallest increase in the number of students: 38% more in 2005 than 1985.

*See Appendix A for a discussion of the methodology and assumptions.

In each of the counties, the demand for additional educational services is projected to grow more rapidly between 1985 and 1995 than between 1995 and 2005. Annual growth from 5 to 11% would occur in Carbon, Duchesne, Emery, Grand, and Uintah counties between 1985 and 1995, but in the following 10 year period, each of those counties is expected to realize a slight decline in the demand for educational services. The number of students in Garfield and Wayne counties would increase throughout the 20 year period, albeit at a slower rate after 1995.

It is projected that the number of students in 1985 would be from 16% (in Wayne County) to 45% (in Carbon County) greater than the current enrollment in 1982. By 2005, the total number of students in each county would have increased by at least 50% and as much as 100% over the corresponding 1982 enrollment levels. Without an increase in the present capacity of the schools in each county, Carbon County would be operating at 187% of capacity and Uintah County would be operating at 159% of capacity in 2005.

2.4.3 Health Care Services

A description of general health care and mental health care services is presented in this section. Both the existing health care services and the projected demand for health care services in each county are addressed. Emergency medical services are considered separately in Sec. 2.4.4.

2.4.3.1 Existing General Health Care Conditions in the Counties

Carbon County

It has been determined elsewhere that, in general, health care services in Carbon County are at or above recommended service levels.* Castleview Hospital in Price currently has 70 beds; an expansion to 88 beds is planned for completion in December 1983. This hospital also serves Emery County, where there is no hospital.

There are 21 physicians, with a wide range of medical specialties, in the county. Eighteen of the physicians are located in Price, two are in Helper, and one is in East Carbon. The county is also served by 11 dentists in Price and one dentist in Helper.

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*Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Duchesne County

The Duchesne County Hospital in Roosevelt currently has 32 beds and an occupancy rate of about 60%. An ongoing expansion project would raise the capacity to 42 beds and add new facilities throughout the hospital. Five local doctors in Roosevelt are supplemented by doctors flown in to staff the hospital on nights and holidays. These facilities and personnel serve the residents of Ballard and rural Uintah County, as well as residents of other parts of Duchesne County. Additional health care facilities in Duchesne County are located in the town of Duchesne. A clinic there is staffed by nurse-practitioners operating during regular business hours Monday through Friday and on Saturday morning. Two doctors make regular visits to the clinic. There are also six dentists in Roosevelt and one dentist in Duchesne.

Emery County

Since there is no hospital in Emery County, hospital services are provided by Castleview Hospital in Price (Carbon County) and by the Allen Memorial Hospital in Moab (Grand County). Green River has a clinic staffed by a nurse-practitioner, and Castle Dale has a clinic and two physicians. There are two dentists in Castle Dale, one dentist in Ferron, and a dentist visits Green River once a week.

Garfield County

Health care in Garfield County is very limited. A clinic in Escalante is visited by a doctor three days a week. Other physicians, dentists and a small hospital are located in Panguitch, 65 miles from Escalante and 92 miles from Boulder.

Grand County

Allen Memorial Hospital in Moab has 38 beds with four doctors and 15 registered nurses on staff. Consulting physicians include one radiologist and one pathologist.

Uintah County

The Ashley Valley Medical Center, completed in 1980, is a 36-bed hospital located in Vernal. The full-time equivalent of 11.35 physicians work in Vernal along with 10 dentists. Residents of the western part of Uintah County use the Duchesne County Hospital and other health care facilities in Roosevelt.

Wayne County

Wayne County residents generally use the Sevier Valley Hospital in Richfield. The Wayne County Clinic in Bicknell is staffed by a nurse-practitioner and visited by a doctor three days a week. Residents in the Hanksville area use clinic facilities in Green River or Bicknell. There is a part-time dentist in Bicknell.

2.4.3.2 Existing Mental Health Care Conditions in the Counties

Carbon County

A recent study by John Short and Associates* concluded that mental health services in Carbon County could be deemed adequate. An interview with a representative of the state Mental Health Services indicated that the existing mental health center is understaffed and has faced rising admissions and a declining staff since 1978.

Duchesne County

Duchesne County is served by state Mental Health Services with offices in Roosevelt and Vernal in Uintah County. Duchesne County has a staff of two alcohol and drug abuse counselors, two mental health specialists, one psychology resident, and one psychiatric nurse. County residents may also travel to Vernal for appointments with a psychiatrist or a psychologist who are available two days each month.

Emery County

Mental health services in Emery County are provided by the state Mental Health Services office in Price, Carbon County. The state also maintains a permanent office in Castle Dale. A heavy case load increase has been handled by a staff that has declined by 30% since 1978 due to insufficient funding.

Garfield County

Limited mental health services for Garfield County are available in Panguitch, as a satellite operation of the state Mental Health Services in St.

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*John Short and Associates, Sage Point/Dugout Canyon Project: Infrastructure and Community Plan, p. 125 (Jan. 1983), as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

George. One full-time psychologist is located in Panguitch and a psychiatrist visits the Panguitch office two times a month.

Grand County

Two psychiatrists serve as consulting physicians at Allen Memorial Hospital in Moab.

Uintah County

District VI of the state Department of Social Services provides all mental health care in Uintah County. There are insufficient personnel to handle a significant increase in the number of patients.

Wayne County

There is one mental health worker in Bicknell who is part of the staff of District IV Mental Health Services.

2.4.3.3 Baseline Projection of Health Care Services

Table 2.21 illustrates the change in the demand for health care services resulting from the baseline population projections. The number of additional hospital beds, doctors, dentists, nurses, public health nurses, clinical psychologists, and mental health workers that would be needed in each county between 1985 and 2005 is projected. The largest increases would occur in Carbon and Uintah counties. Only slight increases are expected to occur in Garfield, Grand, and Wayne counties. At no time in any county would more than two additional clinical psychologists or mental health care workers be required.

Since there are no hospitals in either Emery or Wayne counties, even the modest increases in the demand for hospital beds would tax existing resources. The sharp growth in the projected need for long-term care hospital facilities in Uintah County would exceed the capacity of the Ashley Valley Medical Center by 2005 -- even without considering the current demand for such services. The additional demand for doctors would be equal to, or only slightly less than, the present number of doctors in Duchesne, Emery, and Uintah counties.

Table 2.21 Change in Health Care Service Demands by County and Year Resulting from the Baseline Population Projections[a]

County/Service Demand	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County							
General Health Care							
Hospital beds							
General care	15	25	29	30	31	6.81	0.67
Long-term care	23	39	39	39	43	5.42	0.98
Medical personnel							
Doctors	5	8	9	9	10	6.05	1.06
Dentists	4	7	8	8	8	7.18	0
Nurses	13	21	25	25	26	6.76	0.39
Public health nurses	2	3	3	3	4	4.14	2.92
Mental Health Care							
Clinical psychologists	1	1	1	1	1	0	0
Mental health workers	1	2	2	2	2	7.18	0
Duchesne County							
General Health Care							
Hospital beds							
General care	11	13	13	12	11	1.68	-1.66
Long-term care	6	9	14	18	24	8.84	5.54
Medical personnel							
Doctors	4	4	4	4	4	0	0
Dentists	3	4	4	3	3	2.92	-2.84
Nurses	9	11	11	10	10	2.03	-0.95
Public health nurses	2	2	2	2	2	0	0
Mental Health Care							
Clinical psychologists	1	1	1	1	1	0	0
Mental health workers	1	1	1	1	1	0	0
Emery County							
General Health Care							
Hospital beds							
General care	6	7	8	7	7	2.92	-1.33
Long-term care	6	6	6	4	4	0	3.97
Medical personnel							
Doctors	2	3	3	2	2	4.14	-3.97
Dentists	2	2	2	2	2	0	0
Nurses	5	6	7	6	6	3.42	0
Public health nurses	1	1	1	1	1	0	0
Mental Health Care							
Clinical psychologists	1	1	1	1	1	0	0
Mental health workers	1	1	1	1	1	0	0
Garfield County							
General Health Care							
Hospital beds							
General care	2	2	3	3	4	0	0
Long-term care	3	3	3	1	2	0	0
Medical personnel							
Doctors	1	1	1	1	1	0	0
Dentists	1	1	1	1	1	0	0
Nurses	2	2	2	3	3	0	4.14
Public health nurses	1	1	1	1	1	0	0

Table 2.21 (Cont'd)

County/Service Demand	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Garfield County (Cont'd)							
Mental Health Care							
Clinical psychologists	1	1	1	1	1	0	0
Mental health workers	1	1	1	1	1	0	0
Grand County							
General Health Care							
Hospital beds							
General care	0	1	1	1	1	-[b]	0
Long-term care	2	2	2	2	2	0	0
Medical personnel							
Doctors	0	1	1	1	1	-[b]	0
Dentists	0	1	1	1	1	-[b]	0
Nurses	0	1	1	1	1	-[b]	0
Public health nurses	0	1	1	1	1	-[b]	0
Mental Health Care							
Clinical psychologists	0	1	1	1	1	-[b]	0
Mental health workers	0	1	1	1	1	-[b]	0
Uintah County							
General Health Care							
Hospital beds							
General care	11	18	19	17	16	5.62	-1.70
Long-term care	10	21	29	35	42	11.23	3.77
Medical personnel							
Doctors	4	6	6	6	5	4.14	-1.81
Dentists	3	5	5	5	4	5.24	-2.21
Nurses	9	15	16	15	14	5.92	-1.33
Public health nurses	2	2	2	2	2	0	0
Mental Health Care							
Clinical psychologists	1	1	1	1	1	0	0
Mental health workers	1	1	1	1	1	0	0
Wayne County							
General Health Care							
Hospital beds							
General care	1	1	2	2	3	7.18	4.14
Long-term care	2	3	4	5	6	7.18	4.14
Medical personnel							
Doctors	1	1	1	1	1	0	0
Dentists	1	1	1	1	1	0	0
Nurses	1	1	2	2	2	7.18	0
Public health nurses	1	1	1	1	1	0	0
Mental Health Care							
Clinical psychologists	1	1	1	1	1	0	0
Mental health workers	1	1	1	1	1	0	0

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and UPED Model Output, Utah State Planning Coordinators Office, (June 1983). See Appendix A for service standard guidelines.

[b]Undefined.

2.4.4 Public Safety

The county and city resources for law enforcement (Sec. 2.4.4.1), fire protection (Sec. 2.4.4.2), and emergency medical services (Sec. 2.4.4.3) are described in this section. Both the existing level of service and facilities and the baseline projections (Sec. 2.4.4.4) of public safety requirements are presented.

2.4.4.1 Law Enforcement

Carbon County

The Carbon County Sheriff's Department serves the unincorporated areas of the county. The 12 officers of the Department also provide backup and dispatching for the police forces of the cities in the county, with the exception of East Carbon, which has its own dispatch service. The only jail in the county is the county jail in Price. The jail has been described as "essentially overcrowded" and not meeting most state and federal standards. An assessment of this situation has determined that "the potential for lawsuits concerning jail standards does exist."*

In addition to the county resources, several of the cities in the county employ law enforcement personnel. Wellington has 1 full-time police officer, Price has 17, Helper has 5, and East Carbon and Sunnyside share 1 officer.

Duchesne County

The Duchesne County Sheriff's Department serves the unincorporated areas of the county and the city of Duchesne. The Department has 10 full-time officers, plus supporting dispatchers and jailers. It is also in the process of reorganizing a jeep posse to assist in search and rescue missions. The Duchesne County Jail in Duchesne can accommodate up to 36 prisoners and averages about 14 prisoners. The facility is not licensed to hold juveniles -- they must be transported to Vernal for detention. Additional law enforcement personnel are located in Roosevelt, which employs 12 full-time officers.

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*John Short and Associates, Sage Point/Dugout Canyon Project: Infrastructure and Community Plan, p. 95 (Jan. 1983), as cited in Nellis, Lee and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Emery County

The Emery County Sheriff's Department serves all areas of the county except for the city of Green River. The Department has 34 full-time officers, dispatchers, and jailers. According to the sheriff, any significant increase in population would necessitate an increase in this force. The Emery County jail in Castle Dale currently accommodates an average of 10 prisoners. The principal problem of the facility is the detention of women or juveniles -- one female or juvenile prisoner uses the same amount of space as 12 men.

Green River maintains its own two-officer police force. Five Utah Highway Patrol officers and two deputy sheriffs are also stationed in Green River.

Garfield County

The current law enforcement needs of Garfield County are handled by a single officer who is paid part-time by the county and part-time by the towns of Boulder, Escalante, and Panguitch. The response time for the officer, located in Panguitch, is one hour to Escalante and one and one-half hours to Boulder.

Grand County

The Grand County Sheriff's Department is composed of the sheriff and six deputies. Calls to the Westwater area are presently infrequent, primarily related to car thefts and drownings. The county jail is located in the courthouse and has a capacity of 16 men and 6 women.

Uintah County

The Uintah County Sheriff's Department serves the unincorporated areas of the county. The Department employs 14.5 officers and six support personnel. Central dispatching is handled through the city of Vernal. The county jail in Vernal is used by all law enforcement agencies operating in the county and accommodates 27 prisoners. "For the jail to comply with federal and state standards, a great deal of upgrading and renovation will have to be done."*

*Ashley Valley Master Plan, Vernal City-Uintah County Planning Office, pp. 12-17 (1982), as cited in Nellis, Lee and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Various city resources supplement the county law enforcement effort. Vernal employs 21 full-time police officers and six support personnel. Naples has three full-time officers. Ballard relies on the county sheriff.

Wayne County

The Wayne County Sheriff's Department has a part-time deputy in Hanksville. There is also a Utah Highway patrol officer stationed in Hanksville. The response time to Hanksville for officers from Loa (the county seat) is approximately one hour, but inadequate radio communication over Capitol Reef National Park may affect service to the Hanksville area.

2.4.4.2 Fire Protection

Carbon County

Carbon County helps fund the fire departments in the cities within the county, and all fire calls are dispatched through the county sheriff's department. Otherwise, fire protection is provided by the local communities. East Carbon has a 12-member volunteer fire protection force and two pumpers and one tanker with a combined 1500 gallon capacity. Helper has a 16-member volunteer force and two pumpers, a tanker, and a pumper/rescue truck with a combined capacity of 2500 gallons. The Price Fire Department has a full-time chief, 25 volunteers, and three pumpers, a pumper/ladder truck, and a tanker with a combined capacity of 4500 gallons. Sunnyside has a 16-member volunteer force and two pumpers with a combined capacity of 4000 gallons. Wellington has a 20-member volunteer force and two pumpers and a tanker with a combined capacity of 2150 gallons.

Duchesne County

Duchesne County is the principal funding agency for the volunteer fire departments located in Roosevelt and Duchesne. The county sheriff dispatches all fire calls in the county. It has been stated that "the fire department in Roosevelt adequately meets existing needs."* The department is equipped with two pumpers and a tanker with a combined capacity of more than 2000 gallons.

*Roosevelt City Master Plan, p. IV-31 (Oct. 1982), as cited in Nellis, Lee and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Emery County

Emery County is the principal funding agency for the volunteer fire departments located throughout the county. The county recently constructed a new fire station in each Castle Valley community and provided new mini-pumper trucks for each department. The county also covered 75% of the cost of a tanker for each department.

Garfield County

Garfield County is the principal funding agency for the volunteer fire departments in Escalante and Boulder. Escalante has two pumps and Boulder has one truck that is currently without a pump.

Grand County

There is a fire truck, owned by the county and operated by volunteers, located in Thompson. During the summer, Grand County pays half of the salary of a state forester for fire protection. Fire protection in the Westwater area is on a volunteer basis.

Uintah County

Uintah County and the city of Vernal cooperate in the maintenance of the Ashley Valley Fire Department. The Department is staffed by 25 volunteers and has four pumpers and a foam and dry-powder truck. Naples has its own volunteer fire department with 20 volunteers and one 1000 gallon pumper. Ballard is served by the Duchesne County Fire Department in Roosevelt.

Wayne County

Wayne County maintains a truck for the Hanksville Volunteer Fire Department, and the local department could be supported by a pumper and personnel from the local BLM Resource Area headquarters. There is also a need for an alarm and alert system for the fire department.

2.4.4.3 Emergency Medical Services

Carbon County

Carbon County provides ambulance service for all parts of the county. All ambulance calls are dispatched through the sheriff's department. The county has 19 active emergency medical technicians and 5 ambulances located in

Price, and 8 emergency medical technicians and 2 ambulances located in Sunnyside.

Duchesne County

Duchesne County provides ambulances staffed by volunteer emergency medical technicians in Altamont, Duchesne, Roosevelt, and Tabiona. The county sheriff dispatches all emergency calls in the county. Duchesne and Roosevelt each have one ambulance. The volunteer emergency medical technicians in Roosevelt have been partially responsible for the cost of their own training.

Emery County

Paid volunteer emergency medical technicians staff four ambulances provided by Emery County in Emery, Ferron, Castle Dale, and Huntington. There are three ambulances in Green River, also staffed by volunteer emergency medical technicians.

Garfield County

Garfield County provides one ambulance in Boulder and one ambulance in Escalante. Four volunteer emergency medical technicians staff the ambulance in Boulder, and five or six volunteer emergency medical technicians staff the ambulance in Escalante.

Grand County

Ambulance calls are dispatched through the sheriff's office in Moab. An informal agreement exists between Grand County and Green River to provide backup ambulance service to the Grand County portion of Interstate Highway 70.

Uintah County

The Ashley Valley Medical Center in Vernal is served by two ambulances staffed by 18 emergency medical technicians. All parts of the county are served by the center with the exception of Ballard, which is served by Duchesne County from Roosevelt.

Wayne County

Wayne County maintains an ambulance in Hanksville and funds the training of the volunteer emergency medical technicians who staff it.

2.4.4.4 Baseline Projection of Public Safety Requirements

Table 2.22 illustrates the change in the demand for public safety services resulting from the baseline population projections. For law enforcement, the number of additional police officers, patrol cars, juvenile holding cells, and the amount of jail space that would be needed in each county between 1985 and 2005 is projected. Similar projections are made for fire protection measured by fire hydrant flow and duration. For emergency medical services, the number of ambulances and emergency medical technicians is projected. In each instance, whenever the standard indicated that a fraction of a service would be needed, the number was rounded up to the next highest integer. For example, if the standard specified that one-half of an ambulance is required by the projected population increase in a county, the county was said to have a service demand of one ambulance.

The additional demand for most services is forecast to be greater between 1985 and 1995 than between 1995 and 2005. The greatest increase in law enforcement services would occur in Wayne and Carbon counties, where the demand for police officers and patrol cars would increase about 7% annually between 1985 and 1995. There are projected to be slight increases in Emery, Garfield, Grand, and Wayne counties in the demand for fire protection services, while the demand for fire protection services in the other counties would remain constant. Similarly, with the exception of increases in Carbon and Grand counties, the demand for emergency medical services is not projected to change between 1985 and 2005.

Considering the inadequate conditions currently existing in the Carbon and Uintah county jails, the additional demand for jail space would be especially severe in those counties. The demand for police officers by 2005 would be well over twice as large as the existing police force in Carbon and Garfield counties and would be roughly equal to the existing force in Duchesne, Uintah, and Wayne counties. It is difficult to compare the existing fire protection services with the demand for fire protection services since the existing services are described in terms of fire hydrant flow and duration. The emergency medical services in each county are expected to be adequate for the projected increase in population.

2.4.5 Utilities

The characteristics of the sewage, solid waste disposal, and water supply and treatment systems throughout the region are detailed in this section (Secs. 2.4.5.1-2.4.5.3). Both the existing facilities and demands and the baseline projections for additional services are described. The projected service requirements for all three utilities are presented in Sec. 2.4.5.4.

Table 2.22 Change in Public Safety Requirements by County and Year as a Result of the Baseline Population Projections[a]

County/Service Demand	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County							
Law Enforcement							
Police officers	15	25	29	30	31	6.81	0.67
Patrol cars	15	25	29	30	31	6.81	0.67
Jail space (sq ft)	3,703	6,161	7,161	7,306	7,551	6.82	0.53
Juvenile holding cells[b]	1	2	2	2	3	7.18	4.14
Fire Protection							
Water flow (gpm)/ duration (hrs)[c]	3,000/10	3,000/10	3,000/10	3,000/10	3,000/10	0	0
Emergency Medical Service							
Ambulances	2	3	3	3	4	4.14	2.92
Emergency medical technicians	14	21	21	21	28	4.14	2.92
Duchesne County							
Law Enforcement							
Police officers	11	13	13	12	11	1.68	-1.66
Patrol cars	11	13	13	12	11	1.68	-1.66
Jail space (sq ft)	2,608	3,033	3,058	2,863	2,703	1.60	-1.23
Juvenile holding cells[b]	1	1	1	1	1	0	0
Fire Protection							
Water flow (gpm)/ duration (hrs)[c]	2,500/10	3,000/10	3,000/10	2,500/10	2,500/10	1.84	-1.81
Emergency Medical Service							
Ambulances	2	2	2	2	2	0	0
Emergency medical technicians	14	14	14	14	14	0	0
Emery County							
Law Enforcement							
Police officers	6	7	8	7	7	2.92	-1.33
Patrol cars	6	7	8	7	7	2.92	-1.33
Jail space (sq ft)	1,305	1,695	1,815	1,640	1,550	3.35	-1.57
Juvenile holding cells[b]	1	1	1	1	1	0	0
Fire Protection							
Water flow (gpm)/ duration (hrs)[c]	1,750/7	2,000/8	2,000/8	2,000/8	2,000/8	1.34	0
Emergency Medical Service							
Ambulances	1	1	1	1	1	0	0
Emergency medical technicians	7	7	7	7	7	0	0

Table 2.22 (Cont'd)

County/Service Demand	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Garfield County							
Law Enforcement							
Police officers	2	2	3	3	4	4.14	2.92
Patrol cars	2	2	3	3	4	4.14	2.92
Jail space (sq ft)	314	464	564	664	764	6.03	3.08
Juvenile holding cells[b]	1	1	1	1	1	0	0
Fire Protection							
Water flow (gpm)/ duration (hrs)[c]	1,000/4	1,000/4	1,250/5	1,250/5	1,500/6	2.26	1.84
Emergency Medical Service							
Ambulances	1	1	1	1	1	0	0
Emergency medical technicians	7	7	7	7	7	0	0
Grand County							
Law Enforcement							
Police officers	0	1	1	1	1	-[d]	0
Patrol cars	0	1	1	1	1	-[d]	0
Jail space (sq ft)	-220	5	110	45	130	-[d]	1.68
Juvenile holding cells[b]	0	1	1	1	1	-[d]	0
Fire Protection							
Water flow (gpm)/ duration (hrs)[c]	0/0	1,000/4	1,000/4	1,000/4	1,000/4	-[d]	0
Emergency Medical Service							
Ambulances	0	1	1	1	1	-[d]	0
Emergency medical technicians	0	7	7	7	7	-[d]	0
Uintah County							
Law Enforcement							
Police officers	11	18	19	17	16	5.62	-1.70
Patrol cars	11	18	19	17	16	5.62	-1.70
Jail space (sq ft)	2,602	4,402	4,672	4,222	3,842	6.03	-1.94
Juvenile holding cells[b]	1	2	2	2	2	7.18	0
Fire Protection							
Water flow (gpm)/ duration (hrs)[c]	2,500/10	3,000/10	3,000/10	3,000/10	3,000/10	1.84	0
Emergency Medical Service							
Ambulances	2	2	2	2	2	0	0
Emergency medical technicians	14	14	14	14	14	0	0

Table 2.22 (Cont'd)

County/Service Demand	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Wayne County							
Law Enforcement							
Police officers	1	1	2	2	3	7.18	4.14
Patrol cars	1	1	2	2	3	7.18	4.14
Jail space (sq ft)	105	215	330	420	510	12.13	4.45
Juvenile holding cells[b]	1	1	1	1	1	0	0
Fire Protection							
Water flow (gpm)/ duration (hr)[c]	1,000/4	1,000/4	1,000/4	1,000/4	1,250/5	0	2.26
Emergency Medical Service							
Ambulances	1	1	1	1	1	0	0
Emergency medical technicians	7	7	7	7	7	0	0

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office, (June 1983). See Appendix A for service standard guidelines.

[b]Number of 16-hour juvenile holding cells.

[c]Water flow in fire hydrants is measured in gallons per minute (gpm) for a length of time (hrs).

[d]Undefined.

2.4.5.1 Sewage System

Table 2.23 presents a summary of the sewage system characteristics in the region. Almost all of the communities are served by a central sewage system. Frequently, a special district is responsible for sewage collection and treatment in a county. The most common type of collection is gravity flow. The type and capacity of treatment facilities vary from county to county.

Carbon County

The Price River Water Improvement District provides sewage treatment for the residents of Helper, Price, Wellington, and the more densely populated but unincorporated areas of Carbon County. The system "is operating at substantially higher levels than those for which it was designed."* A plan to

*John Short and Associates, Sage Point/Dugout Canyon Project: Infrastructure and Community Plan, p. 84 (Jan. 1983), as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table 2.23 Summary of Sewage Disposal System Characteristics by Area (1982)

County/Community	Central System	Collection Type	Number of Existing Connections	Sewage Treatment Plant: Design Flow Capacity (10^6 gal per d)	Sewage Treatment Plant: Average Flow (10^6 gal per d)	Sewage Treatment Plant: System Type	Sewage Treatment Plant: Population Capacity	Expansion Plans
Carbon County								
East Carbon	Yes[b]	gravity flow	963	0.5	0.5	lagoons	4,000	Yes
Helper	Yes[a]	gravity flow	6,200	1.9	2.6	trickling filter	21,500	Yes
Price	Yes[a]	gravity flow	-	-	-	-	-	-
Sunnyside	Yes[b]	gravity flow	-	-	-	-	-	-
Wellington	Yes[a]	gravity flow	-	-	-	-	-	-
Duchesne County								
Duchesne	Yes	gravity flow	425	0.60	0.25	lagoons	2,500	No
Roosevelt	Yes	gravity flow	1,100	1.50	0.50	lagoons	12,000	Yes
Emery County								
Castle Dale	Yes[c,d]	gravity flow	NA	NA	NA	lagoon	7,000	No
Cleveland	Yes	gravity flow	NA	NA	NA	lagoon	1,400	NA
Elmo	Yes	gravity flow	NA	NA	NA	lagoon	700	NA
Emery	Yes[c]	gravity flow	NA	NA	NA	lagoon	1,300	-
Ferron	Yes[c]	gravity flow	NA	NA	NA	lagoon	800	Yes
Green River	Yes	gravity flow	NA	NA	0.15	mechanical trickling filter		Yes
Huntington	Yes[c]	gravity flow	NA	NA	NA	lagoon	3,000	Yes
Orangeville	Yes[c,d]	gravity flow	-	-	-	-	-	No
Garfield County								
Boulder	No	none	-	-	-	septic tanks	-	-
Escalante	No	none	-	-	-	septic tanks	-	-
Grand County	NA	NA	NA	NA	NA	NA	NA	NA
Uintah County								
Ballard	No	none	0	-	-	septic tanks	-	-
Naples	Yes[e]	-	-	-	-	-	-	-
Vernal	Yes[e]	gravity flow	2,000	2.7	1.8	trickling filter	40,000	No
Wayne County	NA	NA	NA	NA	NA	NA	NA	NA

[a]Helper, Price, and Wellington are served by the Price Water Improvement District. A description of the capacity of the district is included under Helper.

[b]Sunnyside and East Carbon share facilities. A description appears under East Carbon.

[c]Served by the Castle Valley Special Service District.

[d]Castle Dale and Orangeville share the same sewage disposal system. A description appears under Castle Dale.

[e]Served by the Ashley Valley Water and Sewer Improvement District facility completed in 1982. A description of the capacity of the facility is included under Vernal.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983), and Utah State Energy Office, et al., *Final Socioeconomic Technical Report, Uintah Basin Synfuels Development* (Feb. 1983).

increase the capabilities of the district recommends increasing treatment capacity to 3.9 million gallons per day, sufficient for a population of 31,500 or about 10,000 more people than the system presently serves.

East Carbon and Sunnyside share a sewage treatment system that consists of gravity collection mains and lagoons. The treatment facility is designed for expansion from the current three to eight lagoons and could serve a population of 4,000.

Duchesne County

Roosevelt uses a gravity flow sewage collection system that is projected to have sufficient capacity through the year 2000. Treatment facilities were designed to accommodate a population of 12,000, but illicit point source inflows have substantially diminished the ability of the treatment facilities to handle growth. Even if the neighboring community of Ballard were to share treatment facilities with Roosevelt, "no projected improvements would need to be undertaken ... unless the per capita flow rate cannot be reduced."*

Sewage treatment in Duchesne consists of lagoons with a population capacity of about 2,500. The Neola Sewer Improvement District provides sewerage in Neola. The treatment facility in the district is at or near capacity.

Emery County

The Castle Valley Special Service District has incorporated the water, sewer, drainage, and road needs of Castle Valley communities into a taxing district that includes both the communities and nearby power plants. The improvement program for the district is designed to support an increase of at least 132% in the Castle Valley population over the next 40 years. The district operates the sewage systems in Castle Dale, Emery, Ferron, Huntington, and Orangeville. The systems in Ferron and Huntington are at or near capacity.

Cleveland has a new central sewage system capable of serving a population of 1,400. Elmo completed a central sewage system in 1982 capable of serving a population of 700. Green River has a mechanical trickling filter sewage treatment plant which does not operate correctly, and the city is actively pursuing funding for a new lagoon treatment facility.

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*Roosevelt City Master Utilities Plan, p. II-16 (1982), as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Garfield County

There is no central sewage system in either Boulder or Escalante.

Grand County

There is no central sewage system in Grand County.

Uintah County

The Ashley Valley had no central sewerage until 1982. The Ashley Valley Water and Sewer Improvement District now operates what will become an almost valleywide sewage system, serving Vernal, Naples, and large unincorporated areas. The new system is designed to serve a population of about 40,000.

Ballard does not have a central sewage system, but a preliminary study of the feasibility of such a system has been funded. It is possible that Ballard would share the treatment facility in Roosevelt. Lack of sewerage has been described as the main obstacle to growth in Ballard.

Wayne County

There is no central sewage system in Wayne County.

2.4.5.2 Solid Waste Disposal System

As seen in Table 2.24, the solid waste disposal system in the region is highly decentralized. Solid waste collection is done by private contractor or on an individual basis throughout the region with the exception of Vernal, which operates a city collection system. In most cases, landfills are operated by the county, although several cities have their own landfill.

There is room for substantial expansion at the landfill in East Carbon. The Duchesne County landfill, located northwest of Myton, has a capacity to handle 10 years of supply at the present rate. The city landfill in Duchesne meets all current standards and has sufficient room for an undefined amount of expansion. Both the Emery County landfill near Castle Dale and the city operated landfill in Green River have an undetermined capacity. Several "dumps" -- not sanitary landfills -- are located in Garfield County. Since these dumps are not engineered, they have an undetermined capacity. The landfill site in Vernal is adequate for substantial growth. The landfill east of Moab has sufficient capacity.

Table 2.24 Summary of Solid Waste Disposal Systems by Area (1982)

County/Community	Collection Method	Landfill System
Carbon County		
East Carbon	Private contractor	Shared with Sunnyside
Helper	Private contractor	Operated by county
Price	Private contractor	Operated by county
Sunnyside	Private contractor	Shared with East Carbon
Wellington	Private contractor	Operated by county
Duchesne County		
Duchesne	Private contractor	Operated by city
Roosevelt	Private contractor	Operated by county
Emery County		
Castle Dale	Private contractor	Operated by county
Cleveland	Private contractor	Operated by county
Elmo	Private contractor	Operated by county
Emery	Private contractor	Operated by county
Ferron	Private contractor	Operated by county
Green River	Private contractor	Operated by city
Huntington	Private contractor	Operated by county
Orangeville	Private contractor	Operated by county
Garfield County		
Boulder	Individual	Operated by city[a]
Escalante	Individual	Operated by county[a]
Grand County	Individual	Operated by county
Uintah County		
Ballard	Private contractor	Operated by county
Naples	Private contractor	Operated by county and Vernal
Vernal	City	Operated by county and city
Wayne County	-[b]	-

[a]Should be considered a dump and not a sanitary landfill.

[b]No solid waste collection in the unincorporated areas of Wayne County.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

In general, solid waste disposal is a potentially limiting factor for all of the affected counties. State health standards requiring "daily covering" of waste material involve both labor and equipment costs. Counties and municipalities throughout the state, but particularly in rural areas, have been unable or unwilling to comply with state standards regarding solid waste disposal.

2.4.5.3 Water System

A summary of the characteristics of the water systems in the region is presented in Table 2.25. The numerous water districts and communities draw upon rivers, springs, reservoirs, and wells as sources for their drinking water. Several areas are approaching or exceeding their available water supply. Problems with existing facilities are also present. Efforts to expand and improve the water system are under way throughout the region.

Carbon County

The Price River Water Improvement District provides drinking water to residents of Wellington and, as a wholesaler through private distribution companies, to many of the residents of the unincorporated but urbanized areas near Price. The district also makes some summer water sales to Price and Helper. Each new connection requires the purchase of one additional acre-foot of storage water in the Scofield Reservoir, where the district owns 1,600 acre feet of water rights. Expansion capabilities "are considered to be excellent."*

East Carbon and Sunnyside share a water system that is supplied by springs located within proposed tar sands development areas. According to the mayor, "mining in these areas could leave the communities without an adequate or usable water source."** An experimental "package" plant is being installed.

Price has seven million gallons per day available from springs and surface water. Currently, however, the Price treatment plant has a design capacity well under peak demand.

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*John Short and Associates, Sage Point/Dugout Canyon Project: Infrastructure and Community Plan, p. 77 (Jan. 1983), as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

**Mayor Dale Andrews, interview, May 3, 1983, as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table 2.25 Summary of Water System Characteristics by Area (1982)[a]

County/Community	Water Source(s)	Quantity Supplied	Storage Capacity (10^6 gal/d)	Filtration Plant		Connections	Distribution Capacity (number of connections)
				Design Capacity	Flow Capacity		
Carbon County							
East Carbon[b]	surface water/springs	2.0 mgd	1.5	1.7 mgd	NA	963	NA
Helper[c]	springs/Scofield Reservoir	0.8 mgd	4.3	NA	NA	1,100	NA
Price	surface water/springs	3.6 mgd[d]	10.5	2.16 mgd	3.6 mgd	3,500	NA
Sunnyside[b]	surface water/springs	-[b]	-[b]	-[b]	NA	NA	NA
Wellington[c]	Scofield Reservoir	-[c]	-[c]	-[c]	-[c]	-[c]	NA
Duchesne County[e]							
Duchesne[f]	surface water	1.35 mgd	2.0	2,000 afd	650 afd	425	2,500
Roosevelt	springs[g]/deep wells	4.0 cfs[g]	2.5	-[h]	-[h]	1,100	3,125
Emery County							
Castle Dale[i]	surface water	1,000 gpm	0.75	1,000 gpm	NA	654	900
Cleveland[j]	surface water	275 gpm	NA	NA	NA	275	NA
Elmo[j]	surface water						
Emery[i]	wells	90-100 gpm	0.5	NA	NA	135	180
Ferron[i]	surface water	1,250 gpm	0.75	1,250 gpm	NA	615	500
Green River[i]	Green River	1.5 mgd	0.5	1.5 mgd	NA	475	NA
Huntington[i]	surface water	1,160 mgd	1.0	1,160 gpm	NA	950	1,050
Orangeville[i]	surface water	750 gpm	0.5	750 gpm	NA	380	680
Garfield County							
Boulder	springs	NA	0.1 (est.)	-[h]	-[h]	55	NA
Escalante	springs	NA	1.0	-[h]	-[h]	315	750
Grand County[k]							
Uintah County							
Ballard[l]	springs[g]/cisterns	0.25 cfs[g]	0.2	-[h]	-[h]	185	NA
Naples[m]	Ashley spring	-[m]	-[m]	-[m]	-[m]	824	NA
Vernal[m]	Ashley spring	9.0 mgd	2.5	-[h]	-[h]	2,223	NA
Wayne County							
Hanksville[n]	NA	NA	NA	NA	NA	48	65

Table 2.25 (Cont'd)

[a]Key to abbreviations:
mgd = million gallons per day
gpm = gallons per minute
afd = acre feet per day
cfs = cubic feet per second
NA = not available

[b]East Carbon and Sunnyside share the same water system. The characteristics of the system are described under East Carbon.

[c]Served by the Price Water Improvement District. The district draws water from the Scofield Reservoir and has 1,600 connections. The filtration plant has a design capacity of 4.0 mgd and has a flow capacity of 1.9 mgd.

[d]Quantity supplied during period of peak use.

[e]An area adjacent to Roosevelt is served by the Johnson Water Improvement District, and an area east of Duchesne is served by the East Duchesne Water Improvement District.

[f]Served by the Central Utah Water Conservancy District.

[g]Served by the Ute Tribe, which owns two springs that supply water to neighboring communities.

[h]No filtration plant is needed.

[i]The Castle Valley Special Service District provides funding support for communities in Emery County.

[j]Served by the North Emery Water Users Association, a private system that can accommodate no new connections.

[k]There is no central water system in Grand County.

[l]Served by the Ballard Water Improvement District, which buys treated water from the Ute Tribe.

[m]The Ashley Valley Water and Sewer Improvement District (2,070 connections), the Maeser District (650 connections), the Jensen District (260 connections), and the City of Vernal (2,223 connections) use the same water system. The characteristics of the system are described here under Vernal.

[n]A private water company operates in the unincorporated community of Hanksville.

Duchesne County

The Johnson Water Improvement District, which serves an area adjacent to Roosevelt, has water rates that are among the highest in the state. The East Duchesne Water Improvement District serves an area east of Duchesne. Duchesne purchases treated water from the Central Utah Water Conservancy District. Substantial over-capacity in the treatment plant for the district has caused a dramatic rise in treatment costs. Storage is also characterized by an excess capacity and there are no problems with distribution. Roosevelt obtains water from seven deep wells and the Ute Tribe. "Roosevelt is at or very near its capacity in water supply," and while the city owns numerous unused water rights, "these water rights would be expensive to develop."* Storage and distribution are also problems.

Emery County

The Castle Valley Special Service District operates the water systems in Castle Dale, Emery, Ferron, Huntington, and Orangeville. A separate irrigation water system is currently being installed by the district to increase the capacity of the water system in Ferron. Improvements are also planned for Huntington.

Cleveland and Elmo have received drinking water from the North Emery Water Users Association, a private system that can accommodate no new connections. The two towns have asked the Castle Valley Special Service District to construct a new public water system for them.

Green River receives water from the Green River. There are no problems with the system: there is considerable excess capacity, Green River can obtain new water rights, and the city has a new treatment plant.

Garfield County

Boulder obtains drinking water from the Boulder Farmstead Water Company, which is also the local irrigation water supplier. Water is obtained from springs and there is an estimated storage capacity of 100,000 gallons.

Escalante receives water from seven or eight springs. The system was recently improved and is designed to handle 750 connections. The spring water is clear and is only chlorinated before distribution.

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*Roosevelt City Master Plan, pp. IV-9, II-14 (Oct. 1982), as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Grand County

Water in Grand County is supplied by wells on an individual basis.

Uintah County

Three special districts provide drinking water to different parts of the Ashley Valley: the Ashley Valley Water and Sewer Improvement District, the Maeser District, and the Jensen Water District. All three districts and the city of Vernal use the same water system. Water is obtained from Ashley Spring, and while the only treatment that is required is de-sanding and chlorination, the existing de-sanding basin is inadequate and, at certain times of the year, the spring is susceptible to turbidity and possibly also to biological contamination. Storage is currently inadequate, and the distribution system is troubled by inadequate pressure, leakage, and badly deteriorated lines. The construction of an aqueduct from Red Fleet Reservoir, a new treatment plant and storage facilities, and improvements in the distribution system are all planned.

Water in Ballard is provided by the Ballard Water Improvement District, which buys treated water from the Ute tribe. One of the two springs which are sources of water for the Ute tribe is located at the same site as a tar sands lease tract. A small part of Ballard is not served by any water system and those living there depend on cisterns for their water source.

Wayne County

The water system in Hanksville is operated by a local water company. The system was upgraded in 1979. It currently serves 48 residential users and could accommodate 65.

2.4.5.4 Baseline Projection of Utility Services

Table 2.26 identifies the changes in utility service demands that would result from the baseline population projections. Additional service demands, corresponding to the baseline population increment, are calculated for each county and five-year increment between 1985 and 2005. Water system needs are presented in terms of the number of connections and the supply, storage, and treatment requirements in millions of gallons per day (10^6 gal/d). Sewage system demands are also presented in millions of gallons per day. Since Utah does not have a solid waste standard, an estimate of solid waste disposal impacts could not be determined.

The demand for utility services between 1985 and 2005 is projected to increase most rapidly in Grand and Wayne counties and least rapidly in Duchesne County. Service demands are expected to increase in each county

Table 2.26 Change in Utility Service Demands by County and Year Resulting from the Baseline Population Projections[a]

County/ Service Demands	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County							
Water System							
Connections	2,390	3,975	4,620	4,714	4,872	6.81	0.53
Supply (10^6 gal/d)	3.8	6.4	7.4	7.5	7.8	6.89	0.53
Storage (10^6 gal/d)	1.9	3.2	3.7	3.8	3.9	6.89	0.53
Treatment (10^6 gal/d)	3.8	6.4	7.4	7.5	7.8	6.89	0.53
Sewage System (10^6 gal/d)	0.7	1.2	1.4	1.5	1.5	7.18	0.69
Solid Waste[c]	-	-	-	-	-	-	-
Duchesne County							
Water System							
Connections	1,683	1,957	1,973	1,847	1,744	1.60	-1.23
Supply (10^6 gal/d)	2.7	3.1	3.2	3.0	2.8	1.71	-1.33
Storage (10^6 gal/d)	1.3	1.6	1.6	1.5	1.4	2.10	-1.33
Treatment (10^6 gal/d)	2.7	3.1	3.2	3.0	2.8	1.71	-1.33
Sewage System (10^6 gal/d)	0.5	0.6	0.6	0.6	0.5	1.84	-1.81
Solid Waste[c]	-	-	-	-	-	-	-
Emery County							
Water System							
Connections	842	1,094	1,171	1,058	1,000	3.35	-1.57
Supply (10^6 gal/d)	1.3	1.8	1.9	1.7	1.6	3.87	-1.70
Storage (10^6 gal/d)	0.7	0.9	0.9	0.8	0.8	2.54	-1.17
Treatment (10^6 gal/d)	1.3	1.8	1.9	1.7	1.6	3.87	-1.70
Sewage System (10^6 gal/d)	0.3	0.3	0.4	0.3	0.3	2.92	-2.84
Solid Waste[c]	-	-	-	-	-	-	-
Garfield County							
Water System							
Connections	203	300	364	429	493	6.01	3.08
Supply (10^6 gal/d)	0.3	0.5	0.6	0.7	0.8	7.18	2.92
Storage (10^6 gal/d)	0.2	0.2	0.3	0.3	0.4	4.14	2.92
Treatment (10^6 gal/d)	0.3	0.5	0.6	0.7	0.8	7.18	2.92
Sewage System (10^6 gal/d)	0.1	0.1	0.1	0.1	0.2	0	7.18
Solid Waste[c]	-	-	-	-	-	-	-
Grand County							
Water System							
Connections	-142	3	71	29	84	-[b]	1.70
Supply (10^6 gal/d)	-0.2	0.1	0.1	0.1	0.1	-[b]	0

Table 2.26 (Cont'd)

County/ Service Demands	Additional Service Demands, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Grand County (Cont'd)							
Water System (Cont'd)							
Storage (10^6 gal/d)	-0.1	0.1	0.1	0.1	0.1	-[b]	0
Treatment (10^6 gal/d)	-0.2	0.1	0.1	0.1	0.1	-[b]	0
Sewage System (10^6 gal/d)	-0.1	0.1	0.1	0.1	0.1	-[b]	0
Solid Waste[c]	-	-	-	-	-	-	-
Uintah County							
Water System							
Connections	1,679	2,841	3,015	2,731	2,479	6.03	-1.94
Supply (10^6 gal/d)	2.7	4.5	4.8	4.4	4.0	5.92	-1.81
Storage (10^6 gal/d)	1.7	2.3	2.4	2.2	2.0	3.51	-1.81
Treatment (10^6 gal/d)	2.7	4.5	4.8	4.4	4.0	5.92	-1.81
Sewage System (10^6 gal/d)	0.5	0.9	0.9	0.8	0.8	6.05	-1.17
Solid Waste[c]	-	-	-	-	-	-	-
Wayne County							
Water System							
Connections	68	139	213	271	329	12.10	4.44
Supply (10^6 gal/d)	0.1	0.2	0.3	0.4	0.5	1.61	5.24
Storage (10^6 gal/d)	0.1	0.1	0.2	0.2	0.3	7.18	4.14
Treatment (10^6 gal/d)	0.1	0.2	0.3	0.4	0.5	11.61	5.24
Sewage System (10^6 gal/d)	0.1	0.1	0.1	0.1	0.1	0	0
Solid Waste[c]	-	-	-	-	-	-	-

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Undefined.

[c]The State of Utah Community Facility Guidelines do not include a solid waste standard. Therefore, an estimate of solid waste disposal impacts could not be determined.

by 1.7% to 12.1% annually between 1985 and 1995. In the following 10 year period, there would be slight decreases in utility service demands in Duchesne, Emery, and Uintah counties, increases in Carbon, Garfield, and Wayne counties, and almost no change in Grand County. The change in demand would show little variation between the different types of utility services.

Given the limited amount of information available on current daily sewage treatment (see Table 2.23), it is difficult to measure the ability of existing sewage treatment facilities to meet the baseline demand projections. The number of connections to the water system would double in Duchesne and Wayne counties by 1985 and in Garfield County by 2000. The greatest pressure is forecast to occur in Wayne County, which can only accommodate 17 more connections to its water system while it is projected to have 329 more connections in 2005, and in Grand County, where presently there is no central water system.

2.4.6 Other Services

This section describes the social and recreational facilities and programs that are available in the communities of interest in the region. Baseline projections for library and park facilities are also included.

2.4.6.1 Identification of Other Services in the Counties*

Carbon County

A wide variety of recreational facilities -- including parks, ball fields, playgrounds, gymnasiums, and swimming pools -- are available throughout the county. Organized community recreation programs and movie theatres are present in a few cities. Residents list numerous forms of outdoor recreation, family- and church-centered activities, shopping, movies, and cultural events at the College of Eastern Utah as choices for leisure time activities. Public libraries are located in Helper and Price. Churches are the most common civic organization, and Scouts, 4-H, Big Brother/Sister, and other church organizations are available for youth. The only social agencies and day care centers in the county are located in Price.

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*Data sources used to prepare this profile are: U.S. Department of Energy, Region VIII, Regional Profile-Energy Impacted Communities, DOE/TIC-100D1 (March 1979), and Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Duchesne County

Recreational facilities are available in Duchesne and Roosevelt. Roosevelt has a year-round community recreation program. Both Duchesne and Roosevelt have a public library. A large number of civic organizations, such as churches, Chamber of Commerce, and Lion's Club, are operating in the county. Several youth organizations are also available. Social agencies and private child care are located in Duchesne and Roosevelt.

Emery County

Community recreation programs are operated year-round in several of the cities in the county. Each of the cities has parks, ball fields, and other recreational facilities. Hunting, fishing, other forms of outdoor recreation, and family- and church-centered activities are listed by residents as leisure time activities. Public libraries are located in Castle Dale, Cleveland, Ferron, Green River, Huntington, and Orangeville. Civic organizations include churches, PTA, and American Legion, while Scouts, 4-H, and church organizations are among the activities available for youth. Private child care can be found in several cities.

Garfield County

There are one or two parks, ball fields, and playgrounds located in Boulder and Escalante. There are no organized recreation programs operating in Boulder or Escalante. Numerous civic and youth organizations are located in each city. No social agencies or public libraries were identified in Boulder or Escalante. Private child care is available in Boulder and Escalante.

Grand County

Numerous social and recreational facilities are located in Moab. Moab, however, is not within the Thompson CCD, which is the only area of interest in Grand County. A description of social and recreational facilities in the unincorporated parts of the county, including the Thompson CCD, is not available.

Uintah County

Most of the recreational and social facilities and organizations in Uintah County are located in Vernal. A year-round recreation program complements the parks, gymnasiums, playgrounds, ball fields, movie theatres, public library, and other facilities in Vernal. Vernal has a Chamber of Commerce, Lion's Club, Kiwanis, and churches among other civic organizations, while

Scouts, 4-H, Big Brother/Sister, and churches are the youth organizations in the city. Social agencies and private child care are also located in Vernal.

Wayne County

A few playgrounds, ball fields, and parks are present in Hanksville. No community recreation programs have been organized. A public library was not identified in Hanksville. Churches, Lion's Club, Scouts, and 4-H are among the civic and youth organizations in Hanksville. No social agencies or child care is available in Hanksville.

2.4.6.2 Baseline Projections of Parks and Library Services

Table 2.27 presents the changes in demand for park and library services brought about by the additional baseline population. Since parks or recreational facilities have been identified in each of the communities of interest, changes in the demand for park services were projected for each community. Changes in the demand for library services were projected only for those communities in which an existing public library was identified. The greatest amount of additional parks and library services would be needed in Price, Vernal, and Roosevelt. Through 2005, a decreasing amount of additional parks and library services would be needed in East Carbon, Sunnyside, and -- in 1985 only -- in Green River.

2.5 FISCAL AND MANAGEMENT CONDITIONS

This section describes the fiscal and management conditions of the counties and communities in the region. Government finances and management conditions are detailed first (Sec. 2.5.1), followed by a description of school district finances (Sec. 2.5.2). Each section addresses both the counties and the communities of interest in this report.

2.5.1 Government Finances and Management Conditions

Table 2.28 provides a summary of the fiscal position of the counties and communities in the region. Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities. Current annual revenues and expenditures for the counties represent calendar year 1983 data while for the communities the corresponding data are for fiscal year 1983. The 1982 mill levy and assessed valuation is also presented for each county and community. A more detailed fiscal profile for each county and community of interest is included in Appendix D, Tables D.1-D.7. A description of management conditions is provided for each county.

Table 2.27 Change in Park and Library Service Demands by County and Year Resulting from the Baseline Population Projections[a]

County/Community	Change in Park Services, by Year[b,c] (number of acres)					Change in Library Services, by Year[b,c] [number of books/space requirements (sq ft)]				
	1985	1990	1995	2000	2005	1985	1990	1995	2000	2005
Carbon County										
East Carbon	-3	-5	-5	-6	-6	-	-	-	-	-
Helper	5	8	8	8	9	1,532/383	2,352/588	2,552/638	2,552/638	2,752/688
Price	26	44	52	55	57	8,428/2,107	14,428/3,607	17,228/4,307	18,228/4,557	18,828/4,707
Scofield	1	1	1	1	1	-	-	-	-	-
Sunnyside	-1	-2	-2	-2	-2	-	-	-	-	-
Wellington	5	8	9	9	9	-	-	-	-	-
Duchesne County										
Duchesne	5	3	4	3	3	1,486/372	884/221	1,008/252	980/245	904/226
Roosevelt	10	13	13	12	12	3,148/787	4,226/1,057	4,184/1,046	3,894/974	3,692/923
Emery County										
Castle Dale	5	6	7	6	6	1,480/370	1,980/495	2,180/545	1,980/495	1,880/470
Cleveland	1	1	1	1	1	116/29	176/44	196/49	176/44	156/39
Elmo	1	1	1	1	1	-	-	-	-	-
Emery	1	1	1	1	1	216/54	216/54	236/59	216/54	216/54
Ferron	4	3	4	3	3	1,064/266	964/241	1,164/291	964/241	964/241
Green River	-1	1	1	1	1	-172/-43	48/12	88/22	88/22	88/22
Huntington	4	5	5	4	4	1,068/267	1,368/342	1,368/342	1,168/292	1,068/267
Orangeville	4	5	5	5	4	1,122/281	1,382/346	1,382/346	1,382/346	1,322/331
Garfield County										
Boulder	1	1	1	1	1	-	-	-	-	-
Escalante	1	1	2	2	2	-	-	-	-	-
Grand County[d]										
Uintah County										
Ballard	2	3	3	3	3	-	-	-	-	-
Naples[e]	4	7	7	7	6	-	-	-	-	-
Vernal	17	27	29	27	25	5,382/1,346	8,930/2,233	9,538/2,385	8,682/2,171	8,096/2,024
Wayne County[f]										

Table 2.27 (Cont'd)

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office, (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

[c]Population declines were projected by UPED for particular communities of interest in this study. As a result, public services and facilities that currently exist would be made more available to the general public if these services and facilities were being used at or above their designated capacity. An accurate determination of the change in existing operating conditions for services and facilities as a result of the baseline population projections is not made herein.

[d]Only the Thompson CCD was identified for consideration in this study and a projection of parks and library services could not be made at this geographic level.

[e]1983 population estimate of 2,400 was used in lieu of a 1980 population figure.

[f]Only the Hanksville CCD was identified for consideration in this study and a projection of parks and library services could not be made at this geographic level.

Table 2.28 Fiscal Condition of the Counties and Communities

County/Community	Revenues (10^6)			1982 Mill Levy	1982 Assessed Valuation (10^6)	Expenditures (10^6)		
	Average Annual[a]	Current Annual[b]	Percent Difference			Average Annual[a]	Current Annual[b]	Percent Difference
Carbon County	4.278	5.192	21.37	16.00	115.190	4.320	5.180	19.91
East Carbon	0.278	0.396	42.45	18.18	3.540	0.414	0.515	24.40
Helper	1.831	1.905	4.04	8.00	6.860	1.511	1.695	12.18
Price	6.573	7.948	20.92	14.35	28.668	6.376	8.019	25.77
Sunnyside	0.200	0.238	19.00	6.00	0.979	0.193	0.268	38.86
Wellington	0.328	0.465	41.77	11.16	3.137	0.345	0.462	33.91
Duchesne County	4.874	6.551	34.41	8.54	205.159	4.209	6.541	55.41
Duchesne	0.423	0.631	49.17	17.00	3.599	0.343	0.634	84.84
Roosevelt	2.355	2.605	10.62	17.87	14.529	2.175	2.671	22.80
Emery County	5.998	6.453	7.59	16.22	233.820	5.799	6.452	11.26
Castle Dale	0.454	0.358	-21.15	14.00	3.893	0.418	0.434	3.83
Cleveland	-	0.174	-	11.00	0.844	-	0.075	-
Elmo	-	0.050	-	11.00	0.591	-	0.029	-
Emery	-	0.081	-	17.65	0.601	-	0.060	-
Ferron	0.347	0.352	1.44	18.65	3.377	0.314	0.353	12.42
Green River	0.256	0.275	7.42	21.00	2.287	0.126	0.322	155.56
Huntington	-	0.577	-	14.25	5.091	-	0.588	-
Orangeville	0.243	0.236	-2.88	21.63	2.704	0.168	0.158	-5.95
Garfield County	2.145	2.266	5.64	6.80	39.831	2.145	1.730	-19.35
Boulder	-	0.018	-	5.00	0.446	-	0.010	-
Escalante	-	0.096	-	10.50	1.600	-	0.072	-
Grand County	2.776	2.637	-5.01	8.11	60.558	2.776	2.637	-5.01
Uintah County	17.787	10.420	-41.42	9.51	252.757	14.905	10.788	-27.62
Ballard	-	0.068	-	0.51	4.381	-	0.068	-
Naples	-	0.653	-	-[c]	-[c]	-	0.652	-
Vernal	4.604	4.949	7.49	1.80	35.738	4.660	5.083	9.08
Wayne County	0.918	0.805	-12.31	12.16	6.682	0.922	0.761	-17.46

[a]Revenue and expenditure budgets for the counties reflect 1980-82 calendar year averages while for the communities it represents averages of the 1981 and 1982 fiscal years.

[b]Current annual budgets reflect 1983 calendar year data for the counties and 1982 fiscal year data for the communities.

[c]No mill levy and a political commitment not to use property taxes as a source of revenue.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Carbon County

Carbon County had an average annual revenue of over $4.2 million between 1980 and 1982. Property taxes accounted for almost 41% of this total. Federal transfers, miscellaneous revenues, and service charges each accounted for over 10% of county revenues during this period.

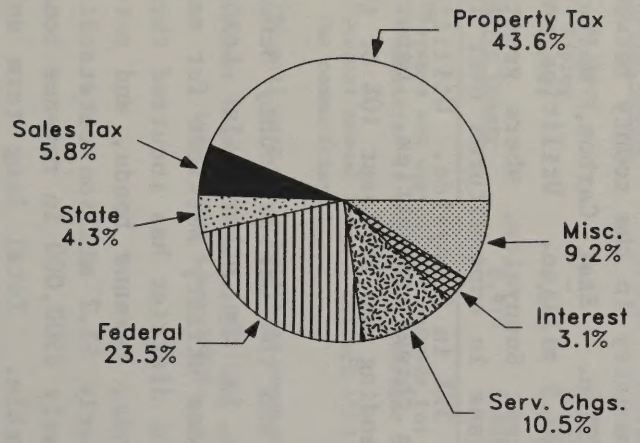
In 1983, the county received revenues totaling almost $5.2 million, an increase of 21% over the previous three years. Property tax revenues grew from $1.75 million to $2.26 million, while federal transfers jumped from $586,000 to $1.2 million. Figure 2.21a illustrates the distribution of revenues by category.

Similar increases occurred for the communities located in the county. Revenues in Price rose from an average of $6.6 million in 1981 and 1982 to $7.9 million in 1983. In the same period, revenues increased 42% in East Carbon, 42% in Wellington, 19% in Sunnyside, and 4% in Helper. In East Carbon, Helper, Price, and Wellington, service charges were the primary source of revenue, accounting for as much as 67% of total revenues in Helper in 1983. Sales taxes and miscellaneous revenues were other main sources of revenue in each community (see Table D.1).

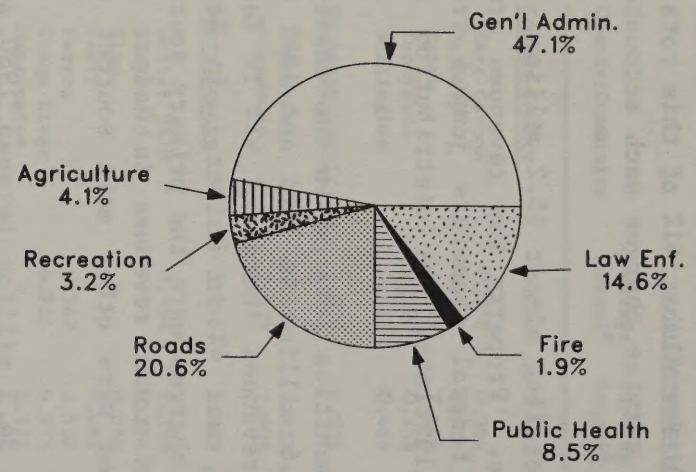
Expenditures in Carbon County averaged $4.3 million between 1980 and 1982. Law enforcement (14%), roads (18%), and general administration (53%) were the largest expenditures for the county. In 1983, county expenditures reached almost $5.2 million — a growth of 20% over the previous three years. Law enforcement, roads and general administration still accounted for 82% of total expenditures (Fig. 2.21b).

Price had the highest spending of any community in the county between 1981 and 1982 — a total of almost $6.4 million. East Carbon, Helper, Sunnyside, and Wellington combined for another $2.5 million. Utilities were the greatest expenditure in each community except Sunnyside, where general expenditures were highest. In 1983, the increase in expenditures over the previous two years ranged from 12% in Helper to 39% in Sunnyside. Utilities accounted for over 60% of total expenditures in three communities. General expenditures, law enforcement, and recreation spending was at least 10% of the total in at least one community.

In addition to the county, communities, and the Carbon County School District, the Price Water Improvement District is the other major taxing jurisdiction in the county. The district provides utility services for many residents within the county (see Sec. 2.4.5). The district has incurred three forms of long term debt: general obligation bonds, revenue bonds, and notes payable. General obligation bonds amount to nearly $3.2 million outstanding or 40% of the bond capacity of the district. Nearly $900,000 in revenue bonds are outstanding, as are $450,000 of notes payable. Total long term debt exceeds $4.5 million. As a result of this debt, annual debt service payments (principal and interest) are approximately $320,000 through 1990 and $280,000 from 1990 to 1995.



a Current Annual Revenue
($5.192 x 10^6)



b Current Annual Expenditures
($5.180 x 10^6)

c Revenue Base Components

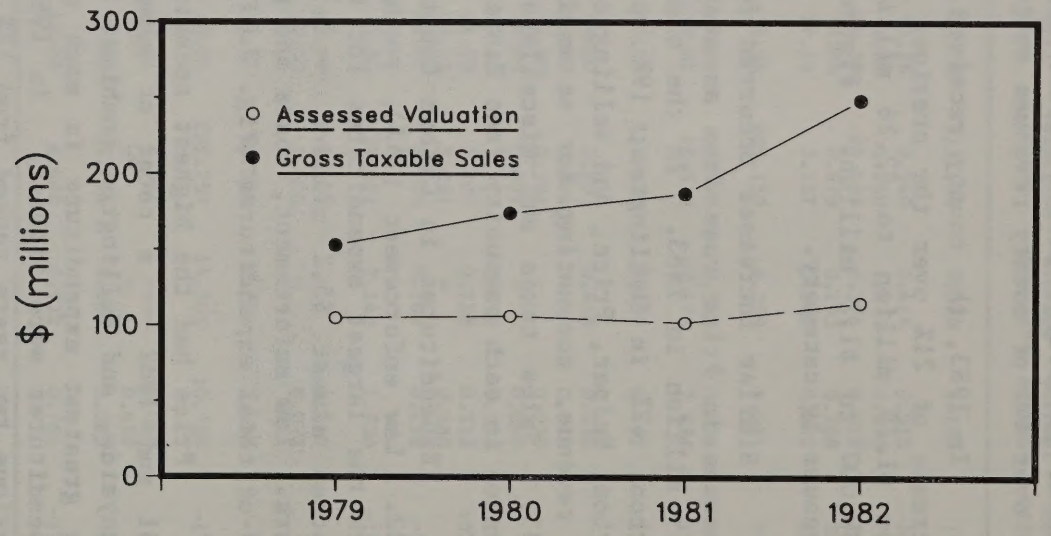


Fig. 2.21 Current Fiscal Profile of Carbon County

The district has three primary sources of revenue -- property taxes, charges for services, and contributions. While operating revenues represent the largest proportion of total revenues, the property tax has become more crucial, not only in terms of financing the operation of the system, but also for retirement of long term debt. Operating revenue does not cover operating expenditures, excluding interest and depreciation. Total expenditures of the district have fluctuated significantly through time, primarily due to variable expenditures for the acquisition of water stock.*

The property tax was collected in Carbon County in 1982 by a 16 mill levy on $115,190,463 in assessed valuation. Sixteen mills is the maximum levy counties may legally levy, though their levies for bond retirement and certain special purposes are not limited. The largest single source of valuation in Carbon County is coal mines (about 31% of the total). The assessed valuation in the county has been fairly stable in recent years (Fig. 2.21c).

Mill levies in the communities in 1982 ranged from 6 in Sunnyside to 18 in East Carbon. The assessed valuation has held relatively constant in each community except Wellington, where the assessed valuation rose from $2.3 million in 1979 to $3.1 million in 1982.

Carbon County had no outstanding general obligation bonds in 1981. East Carbon, Helper, and Price had indebtedness in 1982 ranging from $200,000 to $800,000. Wellington had $6,000 in outstanding general obligation bonds in 1981, and until the 1982 water bond issue Sunnyside had no indebtedness.

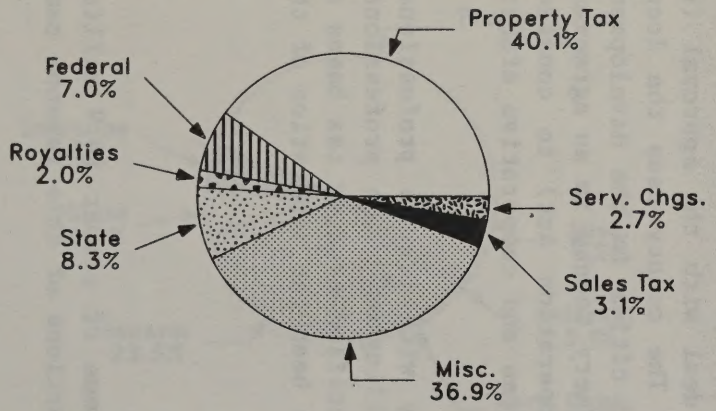
Carbon County has a full-time professional planner and land use controls which have been explicitly designed to deal with the approval (or rejection) of large energy-related developments. The county uses the local Council of Governments to involve the incorporated cities in the development review process. The county also cooperates with Emery County in an agreement (entered into pursuant to Utah's Interlocal Cooperation Act) to consider impacts outside its own jurisdiction. The ordinances and cooperative efforts are indicative of a strong planning system.

Price is the only community in the county with both a professional administrator and a planning consultant, while Wellington has a professional administrator. East Carbon and Sunnyside have identified eroding tax bases as management problems. A major concern in Helper has been the separation of the community by U.S. Highway 6.

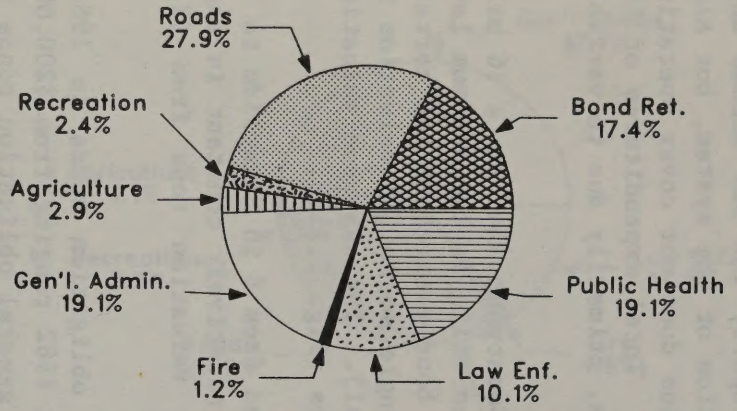
Duchesne County

Duchesne County had an average annual revenue of almost $4.9 million between 1980 and 1982 (Table 2.28). The largest portions of this revenue came

*John Short and Associates, Inc., Sage Point/Dugout Canyon Project: Cost Analysis and Revenue Study, p. 117 (Feb. 1983).



a Current Annual Revenue
($6.551 X 10^6)



b Current Annual Expenditures
($6.541 x 10^6)

c Revenue Base Components

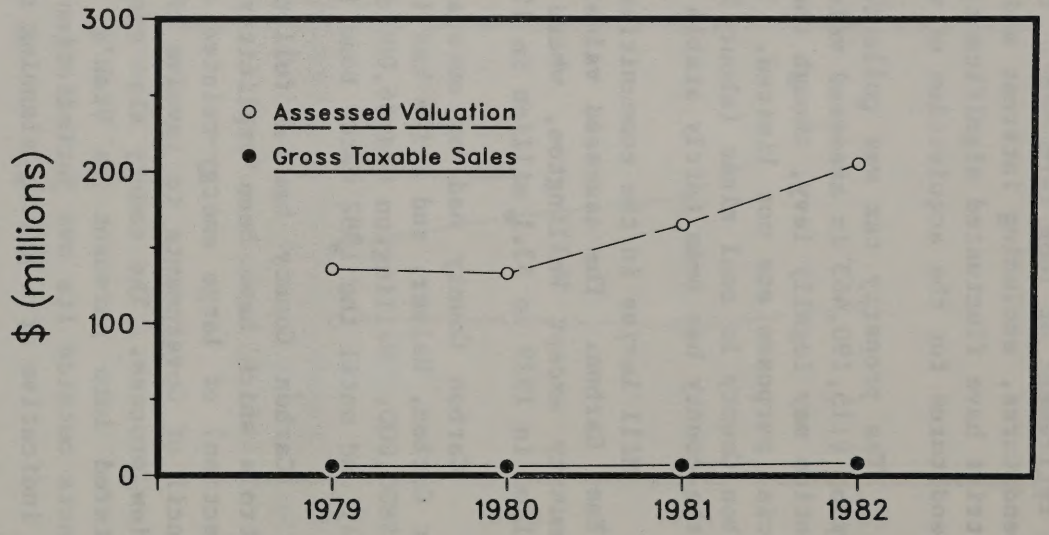


Fig. 2.22 Current Fiscal Profile of Duchesne County

from property taxes (36%), state transfers (26%), and federal transfers (15%). In 1983, revenues increased by one-third, to $6.6 million. Figure 2.22a shows the distribution of revenue sources. Miscellaneous revenues swelled from an average of $339,000 between 1980 and 1982 to $2.42 million in 1983. Property tax revenues also increased, from $1.77 million annually in 1980 through 1982 to $2.62 million in 1983. During the same period, however, royalties declined from $403,000 to $130,000.

Service charges accounted for the greatest portion of revenues in Roosevelt and Duchesne. In 1983 the largest sources of revenue for Duchesne were service charges and miscellaneous revenues, which were 47% and 26% of the total, respectively. Forty-two percent of the total 1983 revenues in Roosevelt came from service charges, 24% came from the sales tax, and 18% came from miscellaneous revenues. Total revenues in Duchesne jumped from an average of $423,000 in 1981 and 1982 to $631,000 in 1983, a 49% increase. The increase in Roosevelt during the same period was much smaller: from $2.4 million in 1981 and 1982 to $2.6 million in 1983.

Expenditures in Duchesne County averaged $4.2 million between 1980 and 1982. Roads accounted for 40% of the total, followed by general administration with 24%, bond retirement with 11%, and law enforcement with 10%. Expenditures rose 55% over the previous two years to $6.5 million in 1983. Spending for public health rose from an average of $181,000 between 1980 and 1982 to $1.25 million in 1983. Roads were still the largest expenditure, but were only 28% of the total (see Fig. 2.22b).

Average annual expenses between 1981 and 1982 totaled $343,000 in Duchesne and $2.2 million in Roosevelt. Spending patterns were comparable between the two cities, with each spending about 40% of their total on utilities, 25% on law enforcement, and 15% on general expenditures. In 1983, expenditures increased 85% in Duchesne and 23% in Roosevelt over the previous two year period. The distribution of expenses remained roughly similar in Roosevelt, but general expenditures became the largest part of spending in Duchesne in 1983.

The property tax in Duchesne County is supported by a current mill levy of 8.54 on $205,158,503 in assessed valuation. The principal source of valuation in the county is oil and gas, about 69% of the total. Recent growth of the county's valuation is shown in Fig. 2.22c. This growth has made it possible for the county to lower its mill levy while somewhat expanding property tax collections.

In Duchesne, the mill levy in 1982 was 17 mills on an assessed valuation of $3,599,159. The assessed valuation doubled between 1979 and 1982. In Roosevelt, the 1982 mill levy was 17.87 mills. The assessed valuation in the city jumped from $6.1 million in 1979 to $14.5 million in 1982.

In 1980, Duchesne County had no outstanding debts, thereby leaving the entire allowed indebtedness of $13.3 million available for future use. Roosevelt had outstanding general indebtedness bonds totaling over $1.3 million. Given an allowable indebtedness of $3.7 million, $2.4 million is available for future use. Duchesne had general obligation bonds totaling $113,000, a statutory debt limit of $1.1 million, and thus, almost $1 million of available debt for future use.*

Virtually all of the federal and state transfer payments came in the form of regular payments, such as payment in lieu of taxes from public lands and special road funds, rather than grants. While the current county budget calls for only about 15% of the revenue to come from state and federal sources, this financial dependence on potentially changeable state and federal policy creates an uncertainty which should be noted in assessing the long-term fiscal capability of the county. A lawsuit recently filed in Massachusetts, for instance, has the Duchesne County Commissioners worried about the loss of over $300,000 in funds that are classified as payment in lieu of taxes.

Recent budgets in Duchesne County show considerable general and special fund surpluses. There has also been a declining mill levy. While this indicates a substantial ability to raise funds to support new services, it also could reflect a fiscal conservatism on the part of local officials that would limit the ability of the county to rapidly respond to growth pressure. Furthermore, Duchesne County has not had an effective planning process. In fact, the difference in development regulations between county and city appears to have artificially stimulated rural growth. But the County Engineer's office has recently undertaken an extensive revision of land use regulations in the county and the County Commissioners have supported this effort with a moratorium on subdivision approvals. The principal planning problem in the county is isolated subdivisions.

In addition to the county, communities, and school district, the Duchesne Mosquito District and the Central Utah Water District are major taxing jurisdictions in the county. The Duchesne Mosquito District had an assessed valuation of $133.1 million, a mill levy of 0.8, and collected $106,480 in taxes in 1980. The debt limit for general obligation bonds allowed by state law was $8 million.

Emery County

Emery County had average annual revenues of $6 million in the years 1980 through 1982. Property taxes accounted for 54% of the total, while miscellaneous revenues accounted for another 20%. In 1983, county revenues were $6.4 million, an 8% increase over the preceding three years (see

*State of Utah, *Uintah Basin Synfuels Development: Final Socioeconomics Technical Report*, pp. I-56, 57 (Feb. 1983).

Table 2.28). Miscellaneous revenues increased most rapidly, state transfer payments increased somewhat less rapidly, property taxes held constant, and federal transfer payments declined. Figure 2.23a exhibits the proportion of current revenue by origin.

Current annual revenues ranged from $50,000 in Elmo to $577,000 in Huntington. For those cities where average annual revenues in 1981 and 1982 were available, 1983 revenues in Green River showed the greatest increase (7%), while 1983 revenues in Castle Dale showed the greatest decline (21%) from the previous two years. Service charges were the largest source of revenue in Elmo, Ferron, Huntington, and Orangeville. Miscellaneous revenues were the largest source in Castle Dale and Cleveland, and the sales tax was the largest source in Green River.

Expenditures in Emery County averaged $5.8 million between 1980 and 1982. General administration and roads each accounted for over 31% of this total, and law enforcement accounted for another 22%. In 1983, the county spent $6.5 million, an increase of 11% over the previous three years. Law enforcement spending declined sharply from an average of $1.26 million annually in 1980 through 1982 to $182,000 in 1983. Expenditures for general administration and roads increased to 45% and 39% of total expenditures, respectively (Fig. 2.23b).

The eight communities of interest in Emery County spent a combined total of just over $2 million in 1983. The greatest increase over the preceding two years occurred in Green River, where expenditures rose 156%. Expenditures for utilities were the largest category of spending in Castle Dale, Elmo, Ferron, and Orangeville. General expenditures were the largest category of spending in Cleveland, Emery, and Huntington. Expenditures for streets were the largest category in Green River.

The property tax in Emery County was raised in 1982 by a 16.2 mill levy on $233,819,867 in assessed valuation. About 73% of the total valuation in the county is in the Hunter and Huntington Canyon power plants. Coal mines associated with the power plants and producing for other markets make up an additional 14% of the valuation. Figure 2.23c shows that the assessed valuation has risen only slightly since 1979.

Among the communities in Emery County, the mill levy in 1982 ranged from 11.0 in Cleveland and Elmo to 21.6 in Orangeville. The assessed valuation rose steadily between 1979 and 1982 in each of the eight communities, reaching a peak of $5.1 million in Huntington in 1982.

In 1981, Emery County had $2,363,587 in outstanding general obligation bonds. The high assessed valuation of the county left it, however, with the capacity to enter into at least an additional $21 million of indebtedness. Between 1980 and 1982, the cities in the county had outstanding debts ranging from $116,000 in Ferron to $1.1 million in Huntington. Cleveland did not have any outstanding debts.

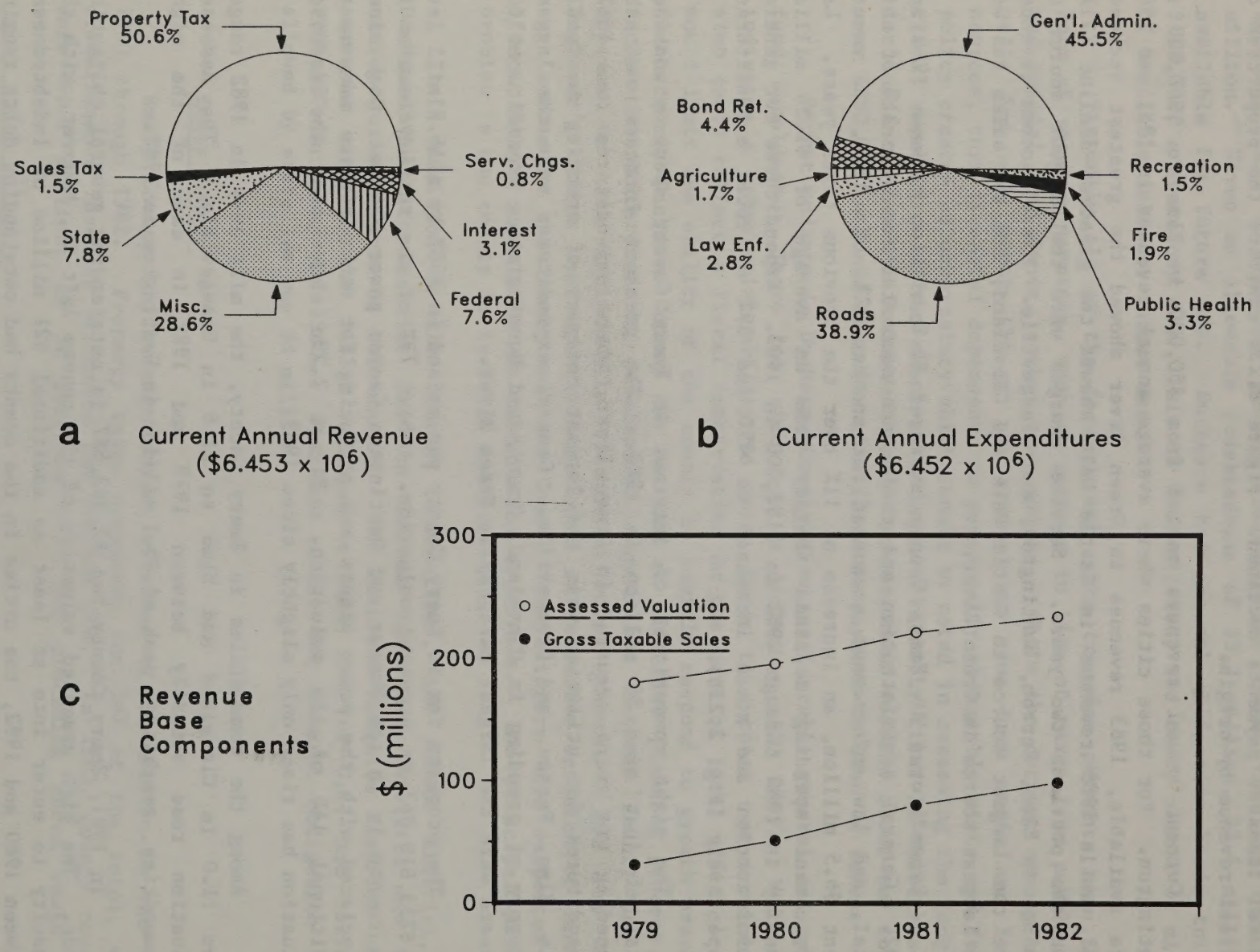


Fig. 2.23 Current Fiscal Profile of Emery County

Transfers from the state and federal government have made up about 15% of the Emery County revenue in recent years. A strong property tax base in Emery County frees it from the dependence that many Utah counties have on state and federal transfer payments.

The extensive use of shared services in Emery County has been an effective response to past growth. The scope of cooperation has even expanded to include a formal agreement (pursuant to Utah's Interlocal Cooperation Act) between Emery and Carbon counties to coordinate their approvals of major energy-related facilities. The one exception to the cooperative provision of services in Emery County is Green River, which is quite isolated from the rest of the county. The isolated nature of Green River could have an impact on the responsiveness of the county to growth there.

Emery County does not have a full-time professional planner, but does have a part-time zoning administrator (the county is zoned) and an active planning commission. Planning should consider some resistance to growth according to some long-time Emery County residents.*

In addition to the county, community, and school districts, the Castle Valley Special Service District (CVSSD) is a major taxing jurisdiction in the county. The CVSSD has incorporated the water, sewer, drainage and road needs of Castle Valley communities (Cleveland, Elmo, Huntington, Castle Dale, Orangeville, Ferron, and Emery) into a taxing district that includes both the communities and the power plants. This gives the district substantial financial power: since 1977, it has bonded for $20 million to support a variety of improvements.

The CVSSD currently has an assessed valuation of $182,461,301 and levies 5.91 mills on that amount. The CVSSD levy is projected to rise to about 14 mills by the time its full program of improvements is in place and all authorized bonds are sold. The operations of the CVSSD are financed by user charges collected by the member communities.

Garfield County

Table 2.28 shows that Garfield County had an average annual revenue of $2.1 million in the period from 1980 through 1982. Service charges, state transfer payments, and federal transfer payments each accounted for about 20% of the total revenues. Property taxes and miscellaneous revenues accounted for another 13% each. In 1983, county revenues totaled $2.3 million.

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*Interview, Les Prall, Southeast Utah Association of Governments, and James Whear, District VII Mental Health Services (May 3, 1983), and Interview, Jo Ann Behling, Ferron Clerk-Recorder (May 10, 1983), as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Miscellaneous revenues increased from an average of $277,000 between 1980 and 1982 to $690,000 in 1983. Miscellaneous revenues were followed by state transfer payments, service charges, and property taxes as the primary sources of county revenue in 1983 (see Fig. 2.24a).

Escalante collected $96,000 in revenues in 1983. Service charges accounted for 34% of the total. Property taxes (21%), sales taxes (18%), and miscellaneous revenues (18%) were other key sources of revenue for the city.

Boulder collected $18,000 in revenues in 1983. State transfer payments accounted for 38% of the total, while federal transfer payments, miscellaneous revenues, property taxes, and service charges each accounted for over 10% of the total.

Expenditures in Garfield County averaged $2.1 million between 1980 and 1982. General administration, with 45% of the total, was the largest category of spending, followed by roads with 24%. In 1983, spending declined to $1.7 million -- a 19% drop from the average of the previous three years. Expenditures for roads increased from an average of $515,000 in 1980 through 1982 to $620,000 in 1983. Figure 2.24b shows that roads and general administration accounted for 61% of total county expenditures in 1983.

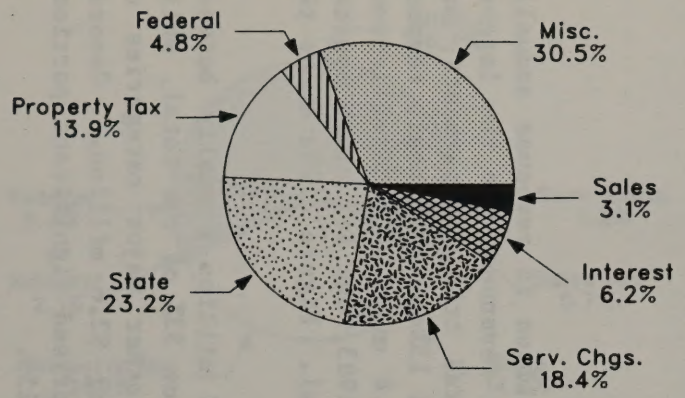
Escalante spent $72,000 in 1983. General expenditures (30%), utilities (28%), and streets (19%) were the primary areas of spending. Expenditures in Boulder totaled over $10,000 in 1983. Forty-nine percent of the total was for general expenditures, while recreation and streets accounted for over 20% each.

The property tax in Garfield County was collected in 1982 by a 6.8 mill levy on $39,831,124 in assessed valuation. About 89% of the total valuation in the county is from oil and gas extraction and uranium mining. Recent growth of the assessed county valuation is shown in Fig. 2.24c.

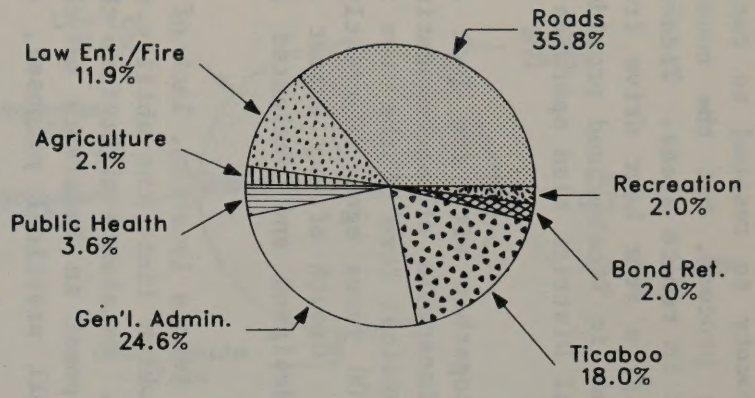
In 1982, the mill levy was 5.0 in Boulder and 10.5 in Escalante. The assessed valuation in each city rose between 1979 and 1980 but has declined somewhat since then. The 1982 assessed valuation in Boulder was $446,000, and the assessed valuation in Escalante was $1.6 million.

In 1981, Garfield County had $315,000 of outstanding general obligation bonds and also $1,775,000 in outstanding revenue bonds. Escalante had $41,000 in outstanding general obligation bonds in 1981.

Just over 40% of the revenues raised in Garfield County between 1980 and 1982 originated from outside the county. These revenues were in the form of state and federal transfer payments, such as state road funds and federal payments in lieu of taxes. The current budget anticipates only about 27% of the revenue being in the form of transfer payments, but potential changes in state or federal funding could have significant impacts on the Garfield County budget. The uncertainty this creates should be taken into account in assessing the fiscal strength of the county.



a Current Annual Revenue
($2.266 x 10^6)



b Current Annual Expenditures
($1.730 x 10^6)

c Revenue Base Components

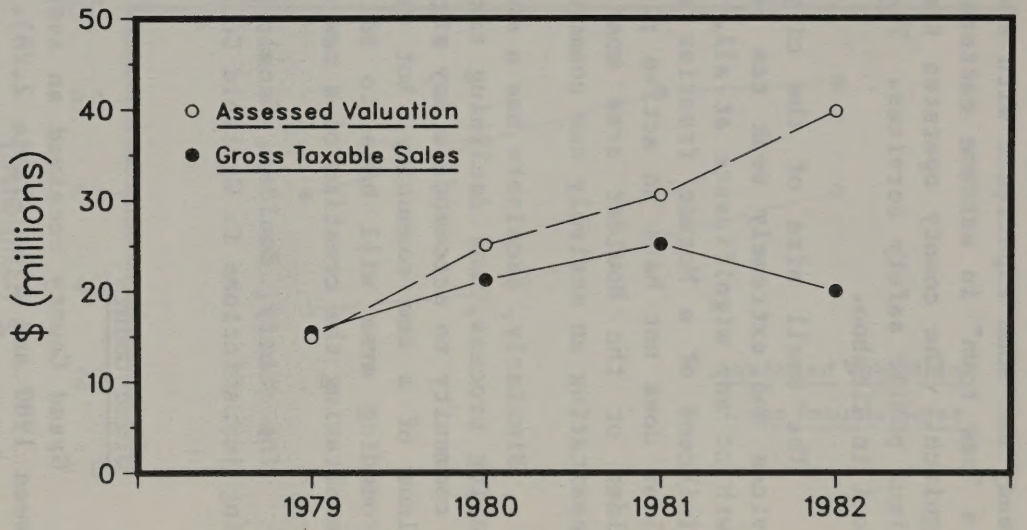


Fig. 2.24 Current Fiscal Profile of Garfield County

Garfield County has a considerable ability to raise funds to support new services, but it is possible that a fiscal conservatism on the part of local officials would limit the ability of the county to respond to rapid growth. Garfield County has no active planning process, but the county already has some experience with energy development in remote areas. Ticaboo is a "new town" in extreme eastern Garfield County, a four hour drive from Panguitch. The county operates the utility systems in Ticaboo and provides minimum public safety services. The Garfield School District also operates a school in Ticaboo.

The small size of the city of Boulder together with its lack of services and extremely weak tax base render it incapable of accommodating growth of any significance at all. The current physical form of the town is reminiscent of a Mormon frontier settlement of 100 years ago. Currently, Boulder does not have an active planning process. Growth of any extent in Boulder or the Boulder area must be planned, designed and evaluated as necessitating an entirely new community.

Similarly, Escalante has a small population, remote location, lack of a planning process, and declining tax base, all of which limit the ability of the community to accommodate any significant growth. Escalante might form the nucleus of a new community, but any major development in Escalante or the surrounding area will have to be treated, for all practical purposes, as necessitating the creation of a new community.

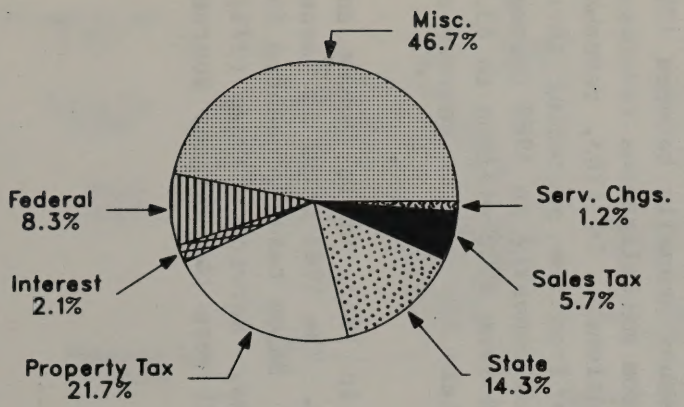
The county, Boulder, Escalante, and the school district are the only taxing jurisdictions in Garfield County.

Grand County

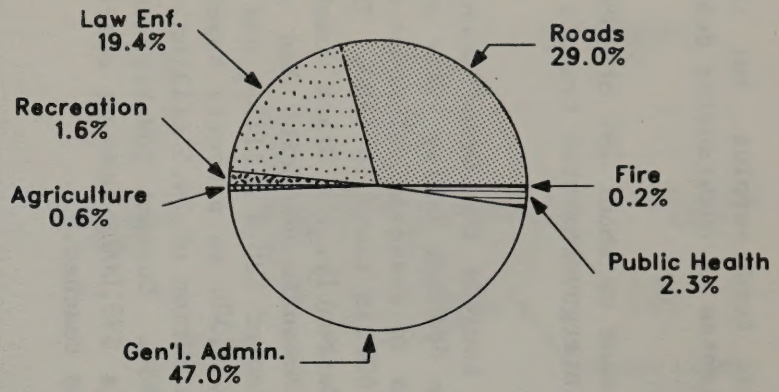
Grand County received an average of $2.8 million in revenues annually between 1980 and 1982 (Table 2.28). Miscellaneous revenues were the largest source (36%) of the total. Property taxes, federal transfer payments, and state transfer payments accounted for 22%, 16%, and 13% of the total, respectively. In 1983, county revenues dropped to $2.6 million. Miscellaneous revenues and state transfer payments increased in 1983, but all other sources of revenues decreased from the previous average level. Figure 2.25a shows the current revenue sources by proportion of the total.

Expenditures in Grand County averaged $2.8 million annually between 1980 and 1982. General administration accounted for 53% of the total, while roads (25%) and law enforcement (16%) were the other major categories of spending. Expenditures declined in 1983, totaling $2.6 million. General administration, roads, and law enforcement each comprised significant portions of total county spending, as illustrated in Fig. 2.25b.

The property tax in Grand County is supported by a mill levy of 8.11 on $60,557,976 in assessed valuation. The mill levy declined from 14.15 in 1979



a Current Annual Revenue
(2.637×10^6)



b Current Annual Expenditures
(2.637×10^6)

c Revenue Base Components

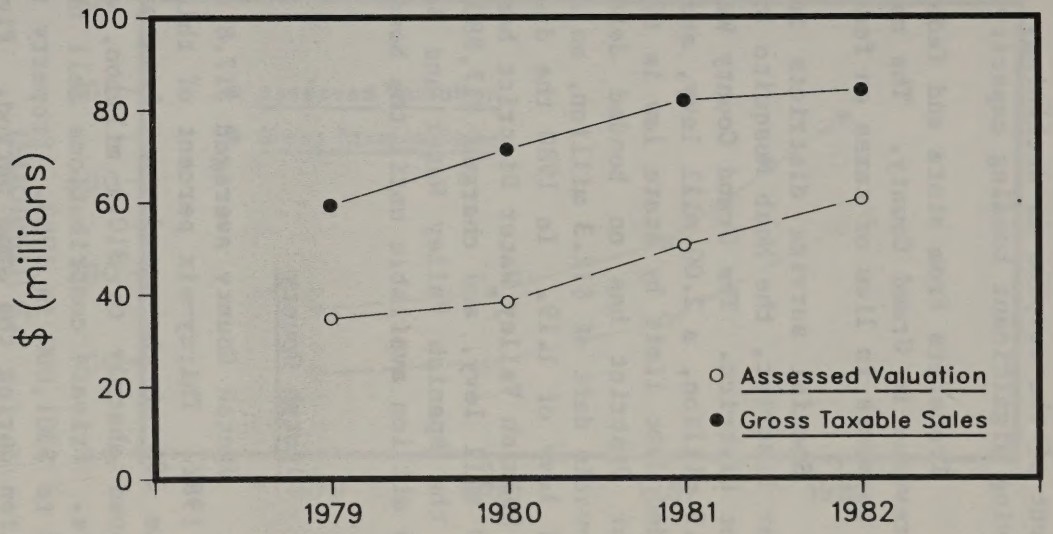


Fig. 2.25 Current Fiscal Profile of Grand County

to 8.11 in 1982. Contrarily, the assessed valuation increased from $35 million in 1979 to $61 million in 1982 (Fig. 2.25c).

The Grand County budget indicates a general fund surplus, but the amount of the surplus is declining. The budget indicates no outstanding debt, leaving significant bonding capacity.

Transfers from state and federal government made up about 29% of 1980-82 revenue in Grand County. The major source of intergovernmental transfers are payments in lieu of taxes on federal lands.

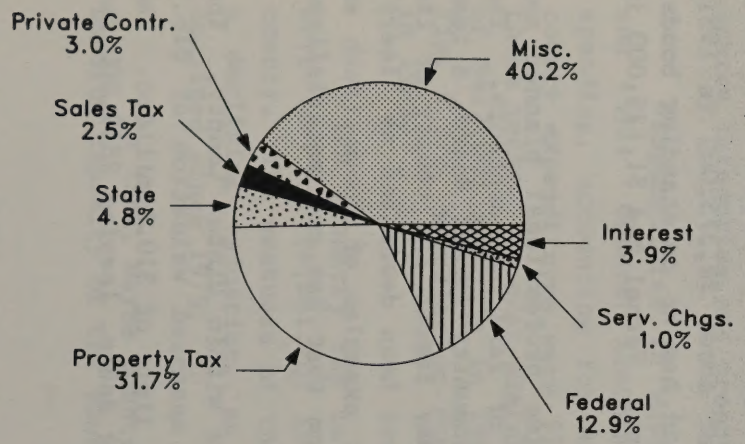
Special service districts in Grand County include the Grand County Water District, the Moab Mosquito District, and the Spanish Valley Water and Sewer District. The Grand County Water District has an assessed valuation of $38.3 million, a 2.00 mill levy, and collected $76,600 in taxes in 1980. The bonded debt limit by state law is $23.0 million. Currently, the Grand County Water District has no bonded debt. The Moab Mosquito District has an allowable debt of $12.3 million, an assessed valuation of $20.4 million, and a mill levy of 1.19. In 1980 the district charged $24,300 in property taxes. The Spanish Valley Water District has an assessed valuation of $4.5 million, a 4.00 mill levy, and charged $17,880 in taxes in 1980. Current indebtedness for the Spanish Valley Water and Sewer District is $95,000, leaving nearly $2.6 million available until the bonded debt limit is reached.*

Uintah County

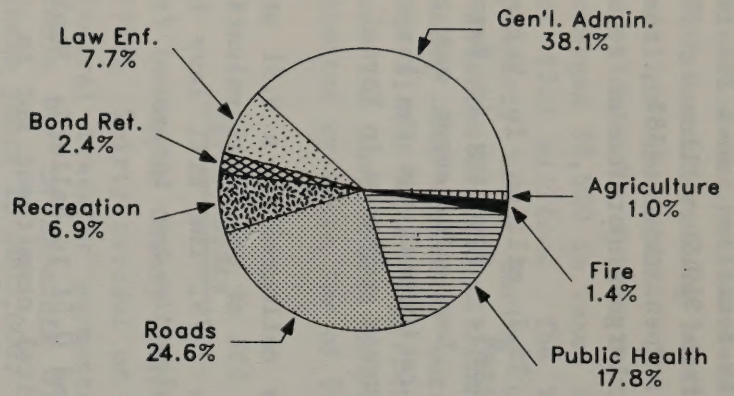
Uintah County averaged $17.8 million in revenues annually between 1980 and 1982. Thirty-six percent of this total came from miscellaneous revenues, while 29% of the total came from private contributions. In 1983, revenues dropped sharply to $10.4 million, a 41% decrease from the preceding three years. Private contributions fell from $5.2 million annually in 1980 through 1982 to $301,000 in 1983. Property taxes increased from $2.2 million to $3.2 million during the same period. Figure 2.26a depicts the current sources of revenue by proportion.

Vernal collected $4.9 million in revenues in 1983, while Naples and Ballard received $650,000 and $68,000, respectively. The 1983 total in Vernal was an increase of 7% over the previous two years. Sales taxes accounted for over half of the 1983 revenue in Ballard and Naples. Service charges (37%), sales taxes (32%), and miscellaneous revenues (27%) were the largest sources of revenue in Vernal in 1983.

*State of Utah, Uintah Basin Synfuels Development: Final Socioeconomics Technical Report, p. I-59 (Feb. 1983).



a Current Annual Revenue
($10.420 x 10^6)



b Current Annual Expenditures
($10.788 x 10^6)

c Revenue Base Components

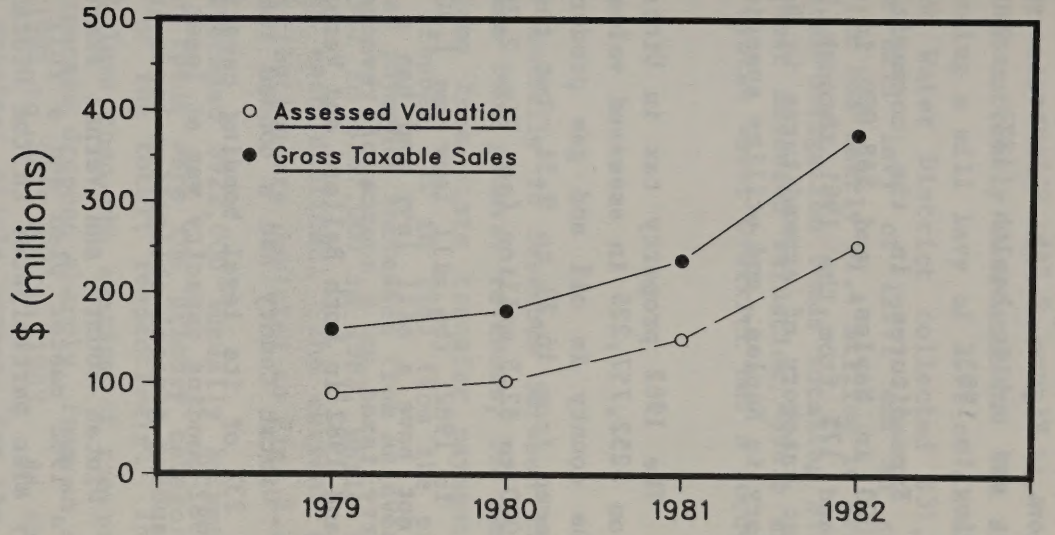


Fig. 2.26 Current Fiscal Profile of Uintah County

Expenditures in Uintah County averaged $14.9 million annually between 1980 and 1982. Roads were by far the greatest expense, accounting for 69% of total county spending. In 1983, spending fell to $10.8 million, down 28% from the previous two years. Road expenditures fell from $10.2 million to $2.7 million. Figure 2.26b illustrates that general expenditures (38%), roads (25%), and public health (18%) accounted for the largest portion of county spending in 1983.

Expenditures in the communities totaled $5.1 million in Vernal, $652,000 in Naples, and $68,000 in Ballard in 1983. Spending in Vernal declined 17% from the 1981 through 1982 average. Law enforcement was the largest category of expenditures in Ballard, bond retirement was the largest category in Naples, and utility spending was the largest category in Vernal in 1983.

The 1982 property tax in Uintah County was collected by a 9.51 mill levy on $252,757,225 in assessed valuation. About 53% of the total valuation in the county is oil and gas production. Since 1979, the mill levy has decreased from 16.28 to 9.51, but the assessed valuation has increased from $886,000 to $2.5 million (see Fig. 2.26c).

In 1982, the mill levy was 1.80 in Vernal and 0.51 in Ballard. Naples does not have a mill levy and has a strong political commitment not to use property taxes as a source of revenue. The assessed valuation rose between 1979 and 1982 in both Ballard and Vernal.

Uintah County had a bonded indebtedness of about $2,375,000 in 1981, about 23% of its legal bonding capacity. Ballard has no outstanding bonds. Its 1982 bonding capacity was at least $2.6 million. Vernal had $1,125,000 in outstanding general obligation bonds in 1981.

Uintah County and Vernal share a full-time professional planner and have a 1982 master plan and a full complement of land use controls. The county also participates in the Uintah County Community Impact Board, a team established to negotiate with industries that may impact the county or its communities. Uintah County elected officials have been described as "leery" about growth prospects, pointing out the nearby examples of booms (such as Rock Springs, Wyoming) and gearing up for a boom that has not materialized (oil shale projects in Colorado).*

Numerous special service districts operate within Uintah County. The Ashley Valley Water and Sewer District has an assessed valuation of $16.9 million, a mill levy of 13.48, and a bonded debt limit of $10.1 million. The Ballard Water District has $103,000 in outstanding debts, leaving $859,800 for

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*Interview, Bob Nicholson, Uintah County Planner, May 12, 1983, as cited in Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

future use. The district has an assessed valuation of $1.6 million, and, with a 4.00 mill levy, collected $6,400 in taxes in 1980. The Jensen Water District has an assessed valuation of $2.2 million and a mill levy of 4.49. With no outstanding bonds, the district has the entire allowable debt of $1.3 million available. The Maeser Water and Sewer District has $1.4 million available for future debt, with $380,000 currently outstanding. The district charged $8,800 in taxes in 1980, assessing a mill levy of 2.95 on a valuation of $3.0 million. The Tridell-LaPoint Water District collected $31,700 in property taxes during 1980, using a mill levy of 12.71 and an assessed valuation of $2.5 million. This district has nearly $1.4 million in available debt, with currently outstanding general obligation bonds totaling $114,100. The Uintah Water District had the highest assessed valuation, $96.6 million, and the lowest mill levy, 1.20. The Uintah Water District has a bonded debt limited by state law of $58 million.*

Wayne County

Wayne County averaged $918,000 annually in revenues between 1980 and 1982. Thirty percent of this total came from general revenues, 28% came from federal transfer payments, and 25% came from state transfer payments (see Table D.7 in Appendix D). Revenues dropped 12% in 1983 from the previous three years to $805,000. State transfer payments increased from an average of $233,000 annually between 1980 and 1982 to $287,000 in 1983, while federal transfer payments and general revenues each declined. The current revenue source categories and proportional distribution are depicted in Fig. 2.27a.

Expenditures in Wayne County averaged $922,000 annually between 1980 and 1982. General administration and roads were the primary categories of spending, accounting for 45% and 32% of the total, respectively. In 1983, county expenditures were $761,000, 17% less than the average of the previous three years. General administration expenses dropped sharply, from an average of $412,000 annually in 1980 through 1982 to $235,000 in 1983. As shown in Fig. 2.27b, spending on roads was the greatest single expense for the county in 1983.

The property tax in Wayne County was raised in 1982 through a 12.16 mill levy on $6,681,702 in assessed valuation — second lowest of any Utah county. The weakness of the property tax base in the county is compounded by a declining valuation, as shown in Fig. 2.27c. The mill levy has also declined since 1979.

In 1982, Wayne County had no outstanding general obligation bonds. The bonding capacity of the county was at least $668,170.

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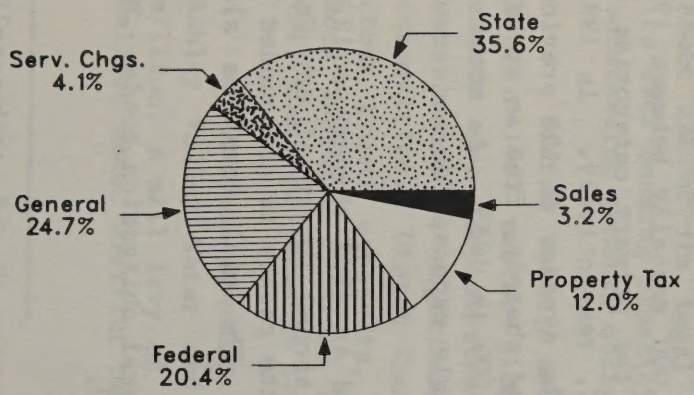
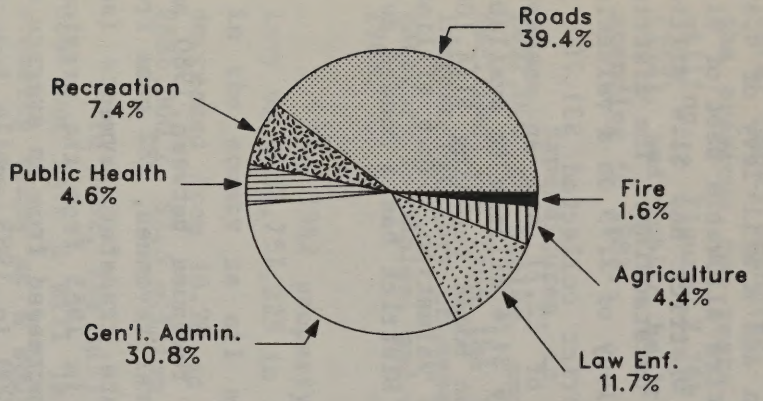
*State of Utah, Uintah Basin Synfuels Development: Final Socioeconomics Technical Report, p. I-60 (Feb. 1983).



a Current Annual Revenues
($0.805 x 10^6)



b Current Annual Expenditures
($0.761 x 10^6)

c Revenue Base Components

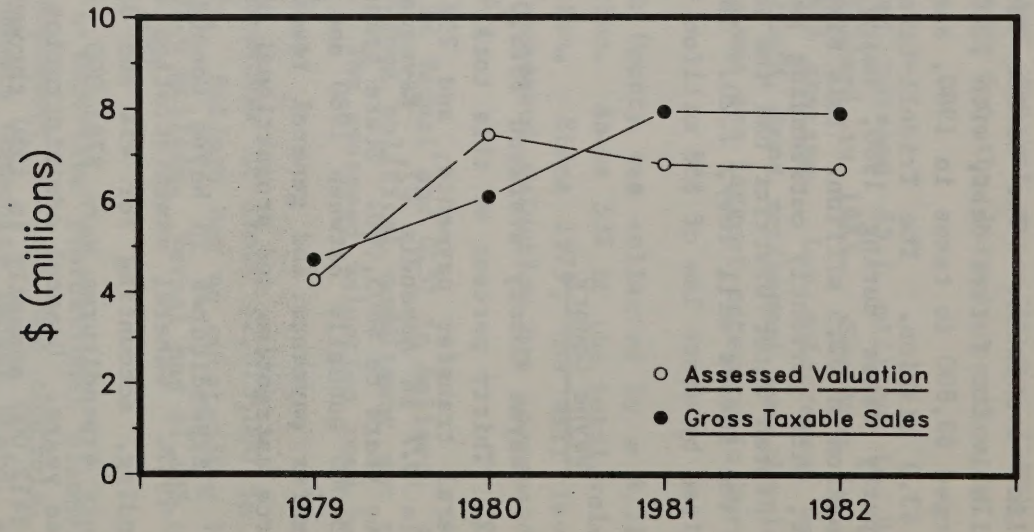


Fig. 2.27 Current Fiscal Profile of Wayne County

Transfers of funds from the state and federal governments made up about 53% of revenues in Wayne County in 1980 through 1982. Transfer funds are anticipated to support about 56% of the current budget. Most of the transfers are regular ones, not special purpose grants, and they include state road funds and federal revenue sharing and payments in lieu of taxes. Intergovernmental transfers are critical to the ability of Wayne County to operate.

The budgets in Wayne County show sizable general fund surpluses and some interest income, but the fiscal conservatism they represent is to be expected in a county which has a very limited tax base and a limited means to raise funds. The weak fiscal position of the county seriously limits its ability to respond to growth.

The isolation of the Hanksville community from the rest of Wayne County could inhibit planning and growth management activities. Currently, there is no active planning process in the county. The Hanksville community cannot realistically be considered as the potential nucleus of a larger community which would evolve from the existing one. Some of its physical form might endure, but the political, social, and infrastructural changes that would be needed to accommodate any sizable growth would, in fact, amount to the creation of an entirely new town.

2.5.2 County School District Finances

Carbon County

The Carbon County School District spent $10 million in 1982. Forty percent of this was raised from property taxes through a 43.66 mill levy on the $115,190,463 valuation of the district. The assessed valuation per student was $20,788 in 1981-82. The budget in the school district rose dramatically along with its mill levy in 1980 and has been quite stable (at between $10 and $11 million) since then. The jump in the budget and mill levy reflect a substantial increase in capital outlays.

Starting salaries in the Carbon School District were slightly above the state average in 1982-83: $13,849 as compared to $13,682. But the maximum salaries were somewhat below average: $22,638 as compared with $23,854 for teachers with a master's degree and 12 years experience.

Carbon County spent $2,130 per student in 1981-82, slightly below the state average of $2,254.

Duchesne County

The Duchesne County School District spent nearly $8 million in 1981-82. About 72% of this money was raised from property taxes through a 34.19

mill levy on the district's $205,158,503 valuation. The district ranked as the eighth wealthiest in Utah in terms of assessed valuation per student, $41,876 in 1981-82, and there has been a steady growth in the valuation available to support school expenditures. The rising valuation of the county has left the district with over $27 million in bonding capacity.

Starting salaries in the Duchesne School District were slightly above the average for the state in 1982-83: $13,736 as compared to $13,682. But maximum salaries were somewhat below average: $23,489, as compared with $23,854 for teachers with a master's degree and about 12 years experience.

Duchesne County spent $2,135 per student in 1981-82, slightly below the state average of $2,254.

Emery County

About 75% of the $12 million in Emery County School District expenditures in 1982 was raised from property taxes through a 38.75 mill levy on the district's $233,819,867 valuation. The district ranks as the fifth wealthiest in Utah in terms of assessed valuation per student, $66,427 in 1981-82, and there has been steady growth in the valuation available to support school expenditures. The tax levy of the school district includes a two mill "leeway," approved by the voters of the county and devoted to salary improvements. Starting salaries in the Emery School District were the best in the state: $16,510 as compared to $13,682. Maximum salaries were also the highest: $26,680 as compared with $23,854 for teachers with a master's degree and 11 years experience.

Emery County spent $4,168 per student in 1981-82, almost double the state average of $2,254.

Garfield County

The Garfield County School District spent $2.75 million in 1982. About 36% of this total was raised from property taxes through a 31.03 mill levy on the district's $39,831,124 valuation. The assessed valuation per student in the district was $34,679 in 1981-82. The school district budget has risen along with its assessed valuation even though the mill levy has declined. Starting salaries in the Garfield School District were above the state average in 1982-83: $13,922 as compared to $13,682. The maximum salaries were near the average: $23,111 as compared with $23,854 for teachers with a master's degree and 12 years experience.

Garfield County spent $3,136 per student in 1981-82, well above the state average of $2,254.

Grand County

The Grand County School District spent $3.52 million in 1982. The district had an assessed valuation of $29,659 per student in 1981-82. Starting salaries were $13,367 in 1982-83, just under the state average of $13,682. The maximum salary for teachers with a master's degree and 12 years experience was $21,121, below the state average of $23,854. The county spent $2,096 per student in 1981-82 also under the state average of $2,254.

Uintah County

The Uintah County School District spent $13.3 million in 1982. About 39% of this was raised from property taxes through a 27.43 mill levy on $252,757,225 of assessed valuation. The assessed valuation per student in the district was $25,712 in 1981-82. The school district budget has risen somewhat with its valuation and its rapidly increasing enrollment.

Starting salaries in the Uintah School District were close to the state average in 1982-83: $13,500 as compared to $13,682. The maximum salaries were also somewhat below average: $23,625 as compared with $23,854 for teachers with a master's degree and 12 years experience.

Uintah County spent $2,513 per student in 1981-82, above the state average of $2,254.

Wayne County

The local portion of the Wayne County School District expenditure of $1.5 million in 1981 and 1982 was raised primarily through a 30.49 mill levy on $6,681,702 assessed valuation. The district ranks as one of Utah's poorest in terms of assessed valuation per student — $14,264 in 1981-82. Average salaries for both starting and experienced teachers in the Wayne District lagged behind state averages in 1982-83: $13,010 for starting teachers as compared with $13,682, and $21,467 as a maximum salary for teachers with a master's degree as compared with $23,854. The district spent $3,084 per student in 1981-82, well above the state average of $2,254.

2.6 QUALITY OF LIFE

This section describes the quality of life in the region, measured in terms of crime rates, divorce rates, alcoholism and drug abuse, and unemployment. When possible, county statistics are related to comparable Utah and national data.

Carbon County

As seen in Fig. 2.28, the crime rate in Carbon County was about 41 per 1,000 population between 1978 and 1981. This was below the Utah rate, which increased from 53 per 1,000 in 1978 to 56 per 1,000 in 1981. The countywide incidence of serious crimes, however, rose 40% between 1978 and 1979. The suicide rate in the county for the period from 1977 through 1981 was 15.21 per 100,000 compared to a Utah rate of 12.52 and a U.S. rate of 12.64. The divorce rate in Carbon County increased from 3.2 per 1,000 in 1972 -- well below state and national averages — to 5.3 per 1,000, identical to the U.S. and Utah rates. There were 1.95 drug abuse arrests per 1,000 population in Carbon County in 1981, compared to the state rate of 2.68 per 1,000. Arrests for alcohol violations in the county were also less than the state as a whole in 1981: 11.74 per 1,000 in Carbon County as opposed to 16.02 per 1,000 in Utah. The county unemployment rate in April 1983 was 18.8%.

Residents listed abundant, well-preserved outdoor recreation opportunities and the small town way of life as key to their social well-being.

Duchesne County

Although the crime rate in Duchesne County jumped from 26 per 1,000 population in 1978 to 36 per 1,000 in 1981, it was still well below the state rate of 57 per 1,000 for the period (see Fig. 2.29). The average annual suicide rate for the county between 1977 and 1981 was 15.81 per 100,000 population. The Utah rate during the same period was 12.52 and the U.S. rate was 12.64. The 1981 divorce rate in the county was 4.6 per 1,000, less than the state and national rate of 5.3 per 1,000. Drug abuse and alcohol arrests in 1981 were much more frequent in Duchesne County than in the state as a

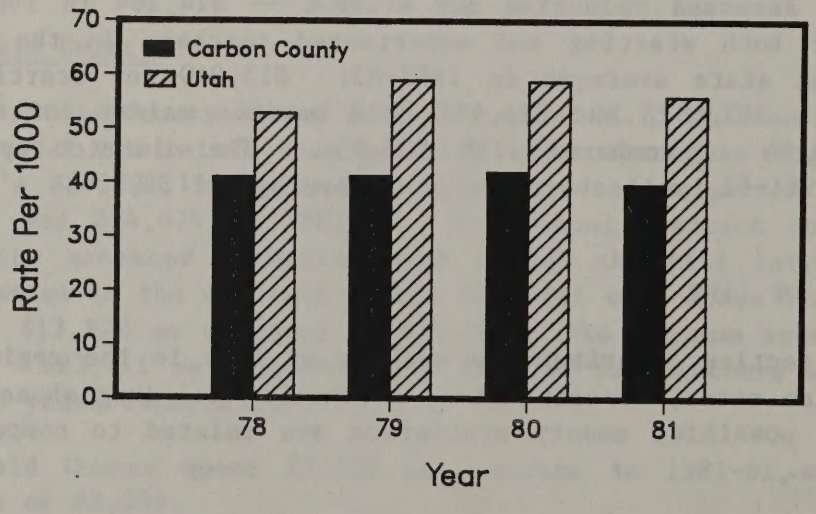


Fig. 2.28 General Crime Rate Statistics for Carbon County

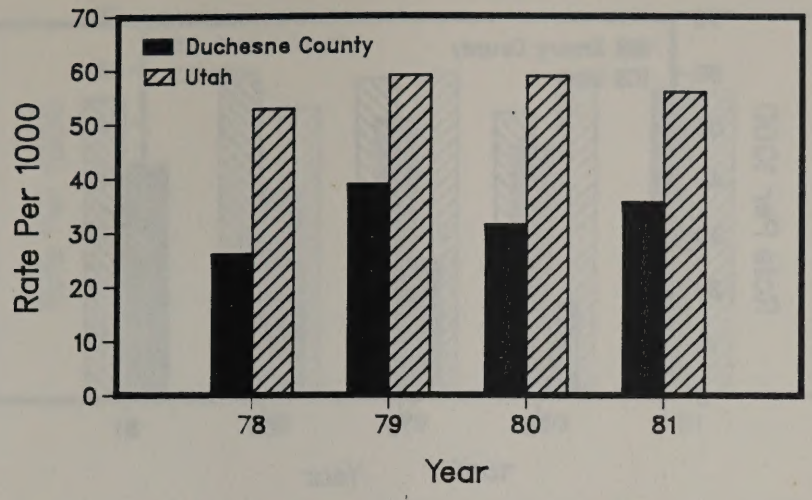


Fig. 2.29 General Crime Rate Statistics for Duchesne County

whole. There were 3.53 drug abuse arrests per 1,000 in the county but only 2.68 per 1,000 in the state, and there were 36.1 alcohol arrests per 1,000 in the county but only 16.02 per 1,000 in the state. The unemployment rate in Duchesne County in April 1983 was 13.6%.

Emery County

Figure 2.30 shows that the crime rate in Emery County rose steadily from 18 per 1,000 population in 1978 to 43 per 1,000 in 1981. The 1981 rate was still below the state rate of 56 per 1,000 for that year. The average annual suicide rate for the county between 1977 and 1981 was 12.02 per 100,000 population, slightly less than the Utah rate of 12.52 and the U.S. rate of 12.64. The 1981 divorce rate in the county of 3.7 per 1,000 population, while much higher than the 1972 rate of 0.2 per 1,000, was still well below the state and national rate of 5.3 per 1,000. There were 1.47 drug abuse arrests per 1,000 population in Emery County, compared to a state figure of 2.68 arrests per 1,000. Similarly, the 8.37 alcohol arrests per 1,000 population in 1981 were far fewer than the 16.02 alcohol arrests per 1,000 in the state during the same year. The unemployment rate in Emery County in April 1983 was 11.2%.

Garfield County

As seen in Fig. 2.31, the crime rate in Garfield County almost tripled between 1979 and 1981. The 1981 rate of 49 per 1,000 population in the county was still below the state rate of 56 per 1,000 in 1981. The suicide rate in the county for the period from 1977 through 1981 was 16.22 per 100,000, compared to a Utah rate of 12.52 and a U.S. rate of 12.64. The 1981 divorce

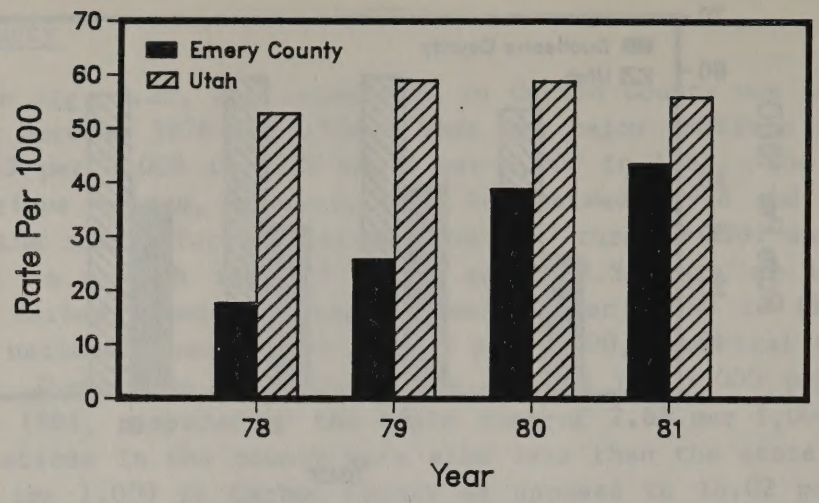


Fig. 2.30 General Crime Rate Statistics for Emery County

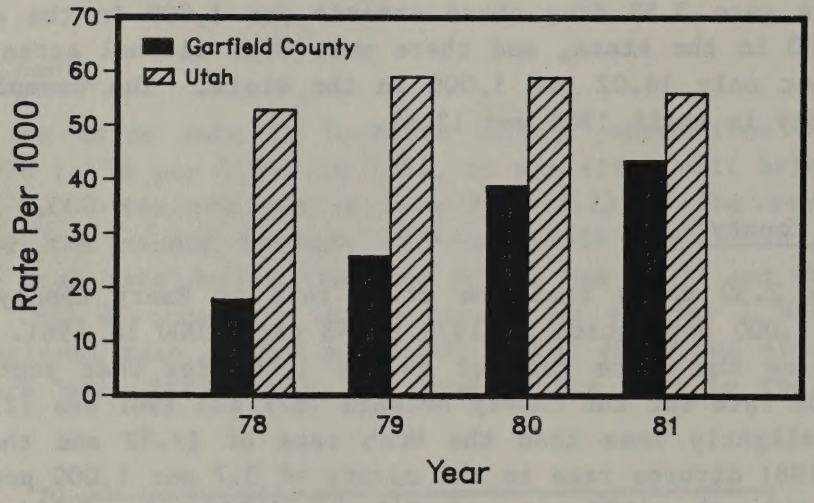


Fig. 2.31 General Crime Rate Statistics for Garfield County

rate in the county was greater than 1 per 1,000. Alcohol and drug abuse violations were relatively uncommon in Garfield County in 1981. There was more than 1 drug abuse arrest per 1,000 population in 1981 compared to 1.68 such arrests per 1,000 in the state, and only 6.49 alcohol arrests per 1,000 in the county, less than half of the Utah rate of 16.02 per 1,000. The unemployment rate in Garfield County in April 1983 was 14.6%.

Grand County

Figure 2.32 illustrates the jump in the crime rate in Grand County between 1979 and 1981. The 1981 rate of 75 per 1,000 population was 75%

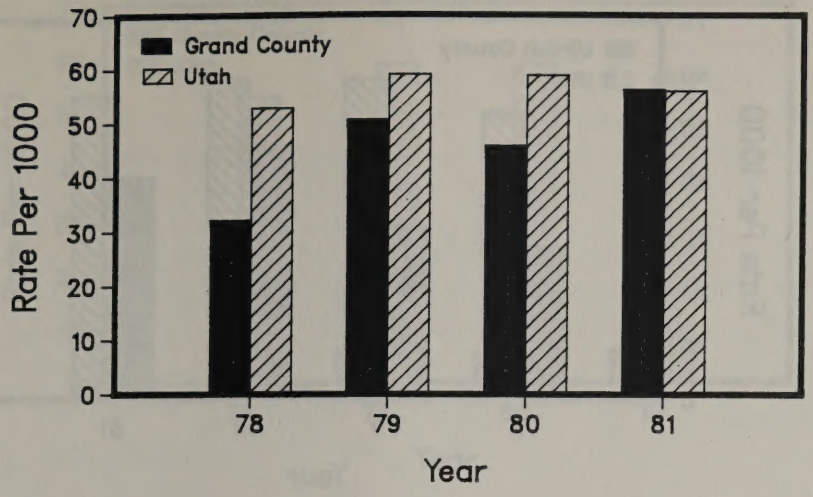


Fig. 2.32 General Crime Rate Statistics for Grand County

higher than the 1979 rate in the county and slightly higher than the state rate in 1981. The average annual suicide rate in Grand County for the period 1977 through 1981 was 9.71 per 100,000, compared to a Utah rate of 12.52 and a U.S. rate of 12.64. The 1981 divorce rate of 7.9 per 1,000 in the county was well above the state and national rate of 5.3. Alcohol and drug abuse violations were much more common in Grand County than in the state as a whole in 1981. There were 4.97 arrests in the county for drug abuse violations per 1,000 compared to a state rate of 2.68 per 1,000. The 39.68 per 1,000 arrests for alcohol violations were more than double the state figure of 16.02 per 1,000. The unemployment rate in Grand County in April 1983 was 20.5%.

Uintah County

The crime rate in Uintah County fluctuated between 1978 and 1981 (see Fig. 2.33). In each year, however, it was substantially below the Utah rate for the period of 56 per 1,000 population. The average annual suicide rate in the county between 1977 and 1981 was 20.29 per 100,000 population, well above the Utah rate of 12.52 and the U.S. rate of 12.64. The 1981 divorce rate in Uintah County was 5.2 per 1,000, almost the same as the U.S. and state rate of 5.3 per 1,000. There were 2.33 drug abuse arrests per 1,000 population in the county in 1981, compared with 1.68 arrests per 1,000 in Utah. Alcohol violations were less frequent in the county than in the state in 1981: 11.79 arrests per 1,000 population in the county compared with 16.02 arrests per 1,000 in the state. The unemployment rate in Uintah County in April 1983 was 13.2%.

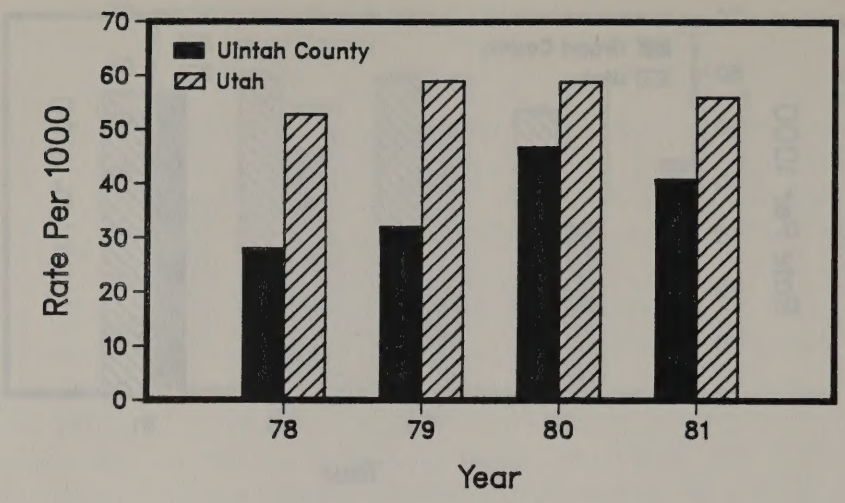


Fig. 2.33 General Crime Rate Statistics for Uintah County

Wayne County

At its highest, the crime rate in Wayne County during the period from 1978 through 1981 was 6.15 per 1,000 population — only one-tenth of the Utah rate (Fig. 2.34). There were no suicides in the county between 1977 and 1981, and there were no arrests for drug abuse violations or alcohol violations in Wayne County in 1981. The divorce rate in the county is more than one per 1,000 population, well below the state and national rate of 5.3 per 1,000 in 1981. The unemployment rate in Wayne County in April 1983 was 12.5%.

2.7 UINTAH AND OURAY INDIAN RESERVATION

The purpose of this chapter is to describe existing conditions and baseline projections for the Uintah and Ouray Reservation. This background will provide a basis for analyzing impacts that might accrue to the reservation as a result of energy developments and other related projects proposed on and in the proximity of reservation lands. The discussions of potential impacts as they may affect the reservation are contained in Sec. 4.1.2.8, Indian Reservation Impacts (High Commercial Development Scenario), and Sec. 4.2.2.8, Indian Reservation Impacts (Low Commercial Development Scenario).

This chapter is based on material contained in the *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983), *Ute Attitudes Regarding Energy Development in the Uintah Basin* (Duncan, 1983), and output from the Utah Process Economic and Demographic Impact Model (UPED79) (Utah State Planning Coordinator's Office, 1983.)

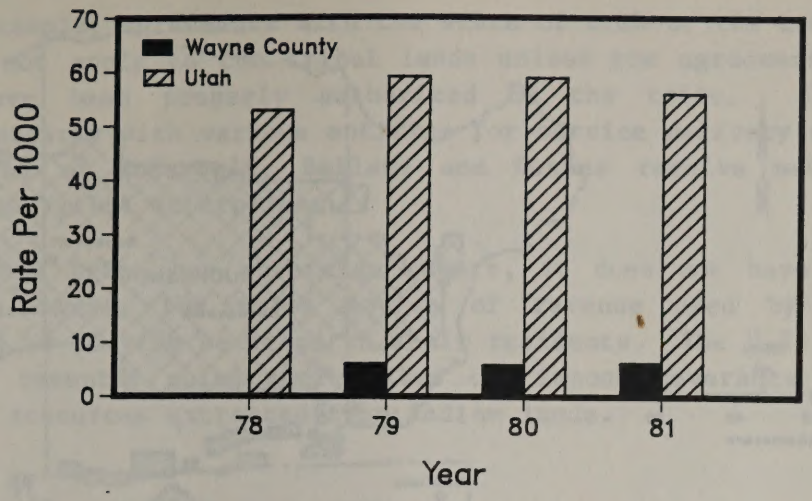


Fig. 2.34 General Crime Rate Statistics for Wayne County

2.7.1 Background

The Uintah and Ouray Reservation of the Northern Ute Indians is a very large, irregularly-shaped tract of land located in parts of four Utah counties: Duchesne, Grand, Uintah and Wasatch. The reservation boundary, identified in Fig. 2.35, encompasses an area of 1,700,000 acres (2,000 square miles). Of this area, 1,006,903 acres are tribally owned, 14,542 acres are allotted, and subsurface rights to 429,000 acres are controlled by the tribe. Land blocks include a large northern section laying east to west, and a smaller southern section laying north to south, referred to as the "Hill Creek Extension." Half of the Hill Creek Extension, south of the Grand County line, is basically undeveloped and was designated as a "wilderness" area by tribal resolution in 1980.

The Northern Ute tribe comprises three bands or tribal political units totaling 1,724 registered tribal members: the Uintah; the Umcompahgre; and the White River. The Indian population is concentrated in the communities of Randlett, Fort Duchesne, and Whiterocks, with minor dispersion in Ouray, Myton, Arcadia and Neola. The racial mix within the external boundaries of the Reservation is approximately 12% Indian and 87% non-Indian.

The tribe, headquartered in Fort Duchesne, is governed by an elected business committee comprising six officials: two representatives from each band, elected for four year overlapping terms. The committee is self-governing with the chairman and vice-chairman elected within the committee for two year terms. The business committee is empowered by the tribal constitution and bylaws to act on such matters as negotiating for loans, formation of enterprises, and contracting with other agencies.

The tribal business committee has sovereign power over tribal lands, and must be dealt with in the same manner as one would treat a sovereign

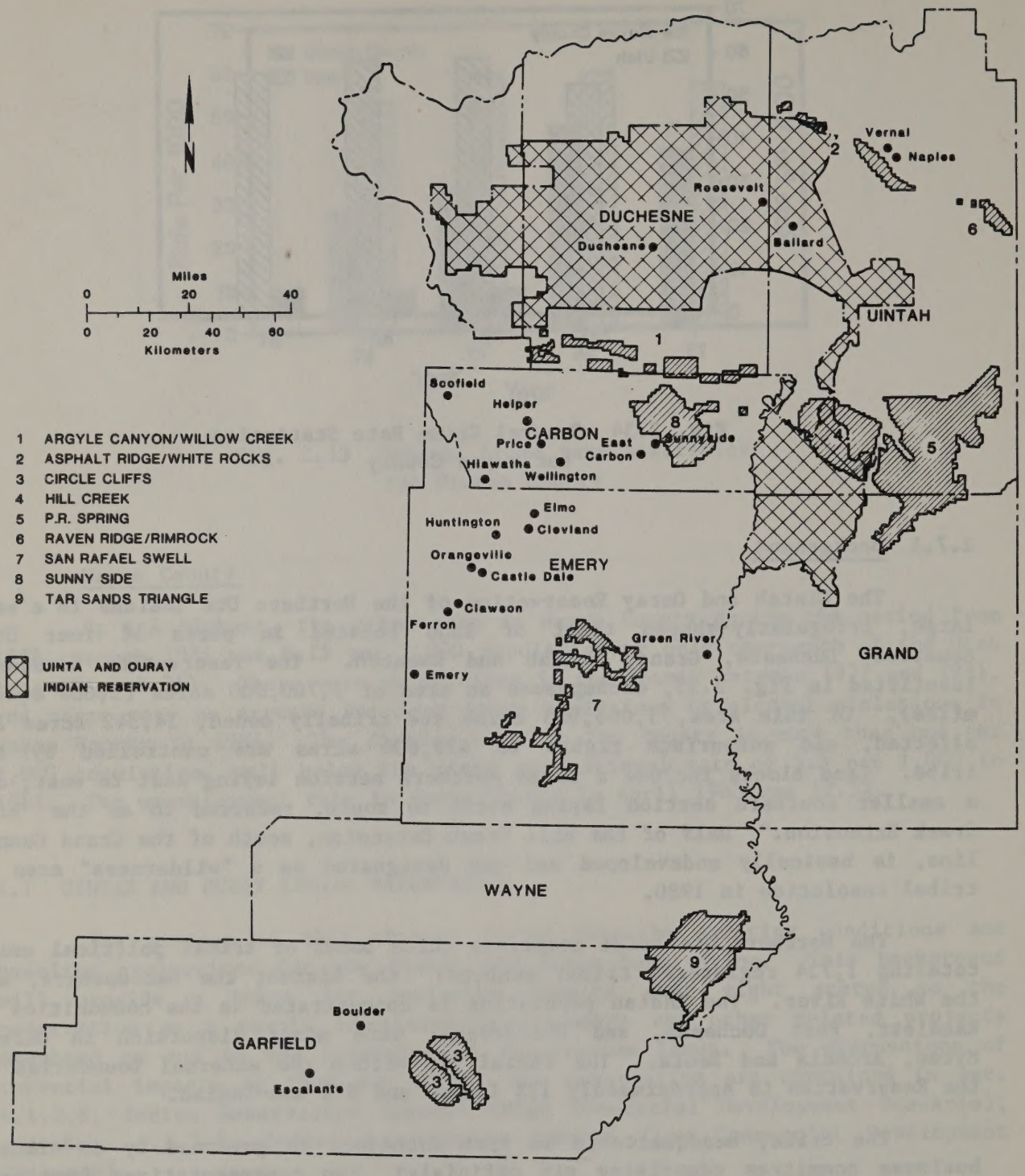


Fig. 2.35 General Boundaries of the Uintah and Ouray Reservation

power. For example, agreements with the state of Utah or the counties, cities and towns do not apply to the tribal lands unless the agreements include the tribe and have been properly authorized by the tribe. The tribe has negotiated contracts with various entities for service delivery systems, e.g., the communities of Roosevelt, Ballard and Gusher receive water and sewer service through tribal enterprises.

While the tribe has sovereign powers, it does not have the power to levy property taxes, the major source of revenue used by counties and municipalities to provide services to their residents. The U.S. Supreme Court has, however, recently ruled that tribes can impose severance taxes on oil, gas and other resources extracted from Indian lands.

2.7.2 Demographic Conditions and Trends

1980 Census data indicate that 2,050 American Indians reside on the reservation. These data are displayed in Table 2.29. Further, the block statistics from the Bureau of the Census indicate that in 1980, the following areas were residences of American Indians:

Area	American Indian (% of Population)
Duchesne County	
Remainder of Roosevelt division	3
Myton city	7
Roosevelt city	2
Uintah County	
Remainder of Uintah and Ouray division	46
Ballard town	3

The U.S. Public Health Service (USPHS) maintains records on recognized tribal members. Also, the Ute tribe maintains a listing of enrolled Utes, those with 5/8 or more Ute blood. Table 2.30 lists the current population from these sources, and projected population growth based on the 2.9% annual rate used by the USPHS. The growth rate is a composite of changes due to anticipated births, deaths, and migration.

According to Census data, 31% of the reservation population is of school age. The median age is 19.4 years which is younger than the median age of 24.2 for the state as a whole, 23.7 for Vernal, and 22.9 for Roosevelt. This indicates that population will most likely increase because a majority of the Indians on the reservation are of child-bearing age.

Table 2.31 lists the residences of all enrolled adult Ute members. The one-fourth that do not reside on the reservation might be induced to return. Enrolled members may return to the reservation at any time.

Table 2.29 General American Indian Population Characteristics of Uintah and Ouray Reservation

Area	Total Population	Age Categories			Median Age
		Under 5	5 to 17	18-64	
Reservation	2,050	324	632	1,011	19.4
Duchesne County Portion	292	40	96	139	19.4
Uintah County Portion	1,758	284	536	872	19.4

Source: U.S. Bureau of the Census, General Population Characteristics, Utah, Table 55, as reproduced in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

This study concentrates on the remainder of the Roosevelt and the Uintah and Ouray census county divisions (CCDs, the nonmunicipal areas) because they represent the inhabited Indian lands most likely to be affected by growth resulting from energy development. The Duchesne CCD contains significant areas of Indian land, but is not considered here because, with the exception of a few ranchers, the vast majority of Utes living in the CCD reside in Duchesne.

2.7.3 Economic Base and Employment

Four hundred thirty-two of the potential Ute work force of almost 900 people are employed. Of these, 261 (approximately 60%) work for the tribe.* Table 2.32 shows an occupational listing of those employed by the tribe. The Bureau of Indian Affairs (BIA) also affords some employment opportunities.

According to the BIA, increased oil and gas exploration in the Uintah Basin did not increase employment of Utes. Fewer than 10 members are employed in the oil and gas industry. Should this phenomenon continue for other energy developments, the tribe's employment picture will not be appreciably improved.

*Ute Indian Tribe, Occupational Groups, 1982, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

Table 2.30 Existing and Baseline Forecast Population on the Uintah and Ouray Reservation

Year	Total Reservation[a]	Total Enrolled[b]	Total Nonenrolled[c]
1982	3,118	1,724	1,394
1983	3,207	1,774	1,433
1984	3,297	1,825	1,472
1985	3,395	1,878	1,517
1986	3,495	1,932	1,563
1987	3,596	1,988	1,608
1988	3,705	2,046	1,659
1989	3,816	2,105	1,711
1990	3,932	2,166	1,766
1991	4,046	2,229	1,817
1992	4,163	2,294	1,869
1993	4,284	2,361	1,923
1994	4,408	2,429	1,979
1995	4,536	2,499	2,037
1996	4,668	2,571	2,097
1997	4,803	2,646	2,157
1998	4,942	2,723	2,219
1999	5,085	2,802	2,283
2000	5,232	2,883	2,349

[a]From USPHS, Phoenix, Arizona, October 1982. The USPHS assumes a 2.9% annual growth rate. The service area of USPHS is greater than the Reservation boundaries.

[b]From Ute tribe, October 1982.

[c]Column 1 minus Column 2. The nonenrolled column can be any American Indian.

Source: As reproduced in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

Table 2.31 Enrolled Uintah-Ouray Ute Indians[a]

Geographical Area/State	Enrolled Members: Number by State	Enrolled Members: Number/Percent of Total
Uintah and Ouray Reservation plus 30-mile radius		890/77
Other Areas of Utah		95/8.2
Intermountain States - Total (excluding Utah)		90/7.8
Arizona	22	
Colorado	31	
Idaho	7	
Montana	4	
New Mexico	10	
Nevada	7	
Wyoming	9	
Western Coastal States - Total		36/3.1
California	27	
Oregon	4	
Washington	5	
Midwestern-Mideastern States - Total		22/1.9
Illinois	2	
Kansas	1	
Minnesota	1	
Nebraska	1	
North Dakota	4	
Ohio	2	
Oklahoma	6	
South Dakota	5	
Southern States - Total		11/0.95
Florida	3	
Mississippi	1	
Tennessee	1	
Texas	6	
Eastern States plus Atlantic Seaboard - Total		9/0.78
Maryland	2	
Massachusetts	1	
New York	4	
North Carolina	2	
Alaska		1/0.09
Hawaii		1/0.09
U.S. Total		1,155/99.91

[a]This listing is from a computer printout listing of the 1,724 total enrolled Utes. The 1,155 total are those for which addresses were available. The 569 difference probably reflects children.

Source: Uintah and Ouray Tribal Council, Fort Duchesne, Utah, Oct. 29, 1982, as reproduced in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983)

Table 2.32 Occupations of Ute Tribal Employees

General Clerical and Secretarial	21
Budget, Fiscal and Accounting	13
Medical/Health	22
Para-Professional/Technician	70
Education	47
Recreation	8
Maintenance	26
Management/Professional	21
Law and Order	33
Total	261

Source: Uintah and Ouray Tribe (Sept. 1982), as reproduced in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

Eighty-six Utes are actively seeking work.* To determine if there are skills on the reservation that could be employed in energy development, Table 2.33 was developed. The table indicates that approximately 65 members have skills that could be used in future energy developments.

Income levels show that almost 65% of the employed Utes earn more than $7,000 per year. These figures are higher than in 1975 when the median income was $5,000; however, when adjusted for inflation, no significant real growth was realized.**

2.7.4 Public and Private Infrastructure

2.7.4.1 Housing

There is a current need for 55 housing units on the reservation. The BIA estimates that another 42 housing units need to be replaced, indicating a

*Coonrod, BIA, 1982, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

**OEDP, 1975, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

Table 2.33 Ute Indian Tribe Employees
Semi-Skilled/Skilled

Position	Semi-Skilled	Skilled
Asbestos	0	0
Boiler Makers	0	0
Brick Layers	0	0
Carpenters	2	0
Electrician	1	1 part-time
Elevator Construction	0	0
Glazier	0	0
Iron Worker	0	0
Laborers	20	0
Mill Wrights	0	0
Operating Engineers	3	0
Painters	15	0
Plaster/Cement	0	0
Mason	0	0
Plumber	3	1 part-time
Roofers	15	0
Metal Worker	0	0
Teamster	3	0
Tile Setters	3	0

Source: Personnel Office, Ute Indian Tribe (Oct. 1982), as reproduced in *Final Socio-economics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

need for 97 new housing units. If the USPHS reservation population projections are correct, an additional 180 housing units will be needed in 1990. Furthermore, if the 265 enrolled members not on the reservation return, the total demand for housing units would be 542 units. This assumes one housing unit per enrolled Ute. Then, assuming $30,000 per unit, over $16 million would be needed; if $50,000 per unit is assumed, more than $27 million would be required.

Housing is currently supplied through federal programs, the tribe's special project office, or through an individual's private resources. The Ute Housing Authority has built approximately 22 houses per year since 1967 and has applications for 242 additional mutual help houses and 138 low rent units.

2.7.4.2 Education

Ute students attend public schools in Uintah County and Duchesne County. Seven hundred six Ute children were enrolled in schools in these two counties in the autumn of 1982. If 1990 population projections are correct and if the percentage of school-age children remains the same, there will be 1,220 school-age children on the reservation. Almost 80% of the Ute students from the reservation are enrolled in three schools: Todd Elementary (330) and West Junior High (106) in Fort Duchesne and Union High (120) in Roosevelt.* The additional 514 Indian students would require 21 more teachers by 1990. If the trend of closing BIA boarding schools continues, these students would compete for classroom space with the energy-related population influx projected to occur in the Uintah Basin.**

Currently, the Indian Educational Services sponsor a variety of educational programs. One particular program that may require expansion is the Johnson O'Malley Program that assists Ute students in achieving parity with other students. If schools become crowded as a result of population growth, achievement of parity may be more difficult.

2.7.4.3 Health Care Services

The Indian Health Service of the USPHS provides health care to the Ute Indians. A medical clinic at the Duchesne County Hospital in Roosevelt currently serves the tribe. A new medical clinic at Fort Duchesne is under construction and will replace the hospital clinic. Under the Termination Act of 1954 the clinic serves only enrolled Utes.

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*Montgomery, BIA, 1982, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

**_Final Socioeconomics Technical Report for Uintah Basin Synfuels Development_ (Utah State Energy Office, et al., 1983).

The Indian Health Clinic (IHC) provides outpatient care, family planning, immunization, pharmacology, and mental health services. Manpower consists of 15 full-time staff members. Dental services for the Utes are provided at Fort Duchesne by the USPHS.

Patient visits have remained at approximately 13,500 visits per year since 1974. The level of visits divided by the population indicates an average of five visits per person per year. Approximately one-half of these are follow-up visits. Based on the population projections, patient visits will increase by 4,000 per year by 1990. If this occurs, five additional medical staff personnel will be needed.*

2.7.4.4 Public Safety

Law Enforcement

The Ute tribe has 14 police officers for a ratio of one officer per 223 people. If the population projections are correct and if the current level of service is maintained, an additional four officers will be needed by 1990, and an additional 10 officers by 2000. The tribe also employs six conservation officers, or one officer per 1,900 adjacent non-Indian population. If the population projections for areas adjacent to the reservation are correct, an additional five conservation officers will be needed to maintain the current ratio.* Conservation officers' duties include controlling poaching.

Fire Protection

The tribe currently contracts with the BIA for fire protection. The water distribution system, with its lack of uniform water pressure during some months, may be incapable of supplying the necessary amount of water for fire protection. Fire hydrants on the reservation need up-to-date maintenance. Also, as housing increases on the reservation more fire hydrants will be needed. With increased population the reservation may need to develop its own fire protection capabilities and the BIA may find it difficult to contract for such services.

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*_Final Socioeconomics Technical Report for Uintah Basin Synfuels Development_ (Utah State Energy Office, et al., 1983).

2.7.4.5 Public Utilities

Water Treatment

The majority of the Ute Indian tribe water system was constructed between 1963 to 1965. Due to population growth on reservation lands and in surrounding communities, demands on the system exceed its capacity.*

The water sources consist of the Whiterocks Spring and the Uriah Heap Spring. The Whiterocks Spring collection and distribution system was developed in 1934. The spring area was improved by adding chlorination and chemical feed equipment in the late 1950s and fluoridation equipment in 1974. The Uriah Heap system was developed in 1963-64 with construction of the spring collection facility and transmission pipelines extending to Gusher and Randlett. The transmission pipeline was extended to Ouray in 1971 and fluoridation equipment was added in 1974 at the spring treatment building. The Gusher and Fort Duchesne distribution systems are part of the Uriah Heap system.

The existing distribution systems consists of over 59 miles of pipeline with 8% of the pipelines being 12 in. or larger and 66% 6 in. or smaller. During April and May water demand has exceeded the capacity of the Uriah Heap system. During these months the major 18- and 12-in. lines lose their pressure and accumulate air pockets which seriously reduce pipeline capacity.

The tribal water system has four storage reservoirs with a total capacity of 595,000 gallons. The reservoirs are located at Bottle Hollow, Gusher, Fort Duchesne, and Ouray. The reservoir in Randlett was abandoned due to foundation settlement and cracking. Table 2.34 details the consumption of tribal water.

The tribe projects that the current water sources can accommodate no more than 4.4×10^6 gal/d demand or 2,000 additional connections. The distribution system is, however, already strained. Engineering estimates for pipeline replacement and other system improvements to the end of this century range from $12 million to $20 million in 1981 dollars.** It should be stressed that the tribe supplies water to the areas of Gusher, Ballard,

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*Interoffice Communication, 1982, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

**Interoffice memo, 1982, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

Table 2.34 Uriah Heap and Whiterocks Systems
Water Consumption (1979)

Consumer	Number of Connections	Annual Water Use (gal x 10^6)	Water Consumption, ADD[a] (gal/d)	gal/ connection-day
Indian Residential	282	70.36	193,308	685
Non-Indian Residential	208	57.44	157,375	757
Commercial	29	72.31	198,110	6,831
City of Roosevelt	1[b]	422.13	1,156,521	
Other Wholesale[c]	263	84.68	232,008	850
Total	783	726.93	1,937,322	
Average				774[d]

[a]Average daily demand.

[b]One connection services entire town

[c]Ouray Park Water Improvement District 68 connections
Independence Water Improvement District 30 connections
Ballard Water System 165 connections

[d]Average per capita water consumption based upon 4.0 people per connection is 200 gallons per capita per day.

Source: Uintah and Ouray Tribe (Oct. 1982), as reproduced in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

Roosevelt, and two improvement districts -- Ouray Park and Independence. Roosevelt town is in the process of building its own water system.

Sewage System

The USPHS has prime responsibility for the sewer system. Sewage lagoons are located in Whiterocks, Fort Duchesne, Randlett, Sunshine Acres, Yellowstone subdivision, and Hilltop subdivision.

The Whiterocks system consists of two lagoons with total containment cells, both of which need to be replaced because of improperly operating equipment.* The Whiterocks area can accommodate no additional growth until the sewer system is replaced.

The Fort Duchesne system consists of eight containment lagoons. The system serves areas between Bottle Hollow Resort and the junction of US 40 and SR 88. The system cannot be expanded because it is located in the Uintah River flood plain.

The Randlett system consists of one operating lagoon. In 1980 the cell dikes were raised to prevent overflow. The 6-in. collector system is deemed inadequate by the USPHS.

The Sunshine Acres system is located approximately half way between Fort Duchesne and Randlett. The system consists of two lagoons serving 10 connections. The system, constructed in 1980, has one operating cell. Future expansion is limited because it is also located in the Uintah River flood plain.

The Yellowstone subdivision is located on the north side of US 40 adjacent to Ballard. The two cell lagoon can serve 41 homes. Currently, the system serves 38 homes. In 1981, a new collector system was constructed. Additional cells can be added.

The Hilltop subdivision is south of Ballard and to the west of Bottle Hollow Reservoir. The system has a capacity of 25 homes and currently serves eight homes.

The USPHS engineers indicate that a regional sewer system located south of Randlett may be needed to serve projected baseline population growth.

Solid waste landfills are located in Whiterocks, Fort Duchesne, and Randlett. The Fort Duchesne landfill is also used by Uintah County.

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*Strain, USPHS, Kansas, as cited in *Final Socioeconomics Technical Report for Uintah Basin Synfuels Development* (Utah State Energy Office, et al., 1983).

2.7.4.6 Other Services

Outdoor recreational opportunities abound on the reservation. The Bottle Hollow Reservoir was built for fishing and water skiing. The south half of the Hill Creek Extension has been designated a wilderness area. The tribe plans to retain this area as a limited access, near-natural area for hunting and hiking for tribal members.

2.7.4.7 Fiscal Analysis

Current budget figures are not available. Therefore, this analysis is based on the limited fiscal information provided. Oil and gas royalties together with bonus and lease monies are the largest source of revenue for the Uintah and Ouray tribe.

The second largest source of revenue stems from grants and contracts awarded to the tribe by public and private sources. Given budget cuts in the public sector, these sources may not continue to provide revenue at past levels.

In 1977, the tribe received over $5 million in grants and contracts. Per capita expenditures in 1977 amounted to almost $3,200. To maintain this per capita level of expenditure through 1990, assuming the population projections are correct, the Ute tribe would need to generate an additional $3 million in revenue. By 1985, the tribe would need an additional $1 million to retain the current per capita level of expenditures.

In addition to the revenue and expenditures of the tribe, the Bureau of Indian Affairs in Fort Duchesne receives an annual budget of over $2 million. Again, uncertainty about federal spending and budgeting practices precludes forecasting funding available to assist the tribe in handling projected population increases both on the reservation and in areas served by the tribe.

2.7.5 Ute Attitudes Regarding Energy Development in the Uintah Basin

2.7.5.1 Introduction

At the request of the Vernal and Richfield Districts of the Bureau of Land Management, the Ute tribe conducted a survey of Ute attitudes regarding energy development in the Uintah Basin.*

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*Duncan, D., *Ute Attitudes Regarding Energy Development in the Uintah Basin*, prepared for the Bureau of Land Management (1983).

2.7.5.2 Survey Questions

Table 2.35 presents a summary of the survey questions and responses. It also indicates the sex and age distribution of the respondents and the interviewer's assessment of the respondent's comprehension of the questions. Questions 1 and 2 indicate awareness about the types of energy development projects and associated work forces. Question 3 is concerned with conditions under which energy development might be acceptable. Question 4 is concerned with conditions that could cause opposition to development. Question 5 investigates interest in employment in energy development. Question 6 inquires about sensitive or special areas on the reservation that may have cultural and religious significance to the tribe. This question was further analyzed to examine these areas related to respondents' residences. The interviewer presented a map of the reservation which is divided into five sections (see Table 2.35). Question 7 investigates attitudes about providing non-Indian energy employees with housing on the reservation.

2.7.5.3 Responses to the Survey

Although Questions 1 and 2 indicate awareness of potential new energy development in the Uintah Basin, general awareness of the number of workers needed for the projects is uneven. Males between 18 and 44 years of age were most aware of potential new projects. For females, those 25-44 were most aware. Approximately 20% of the respondents provided reasonable estimates of workers needed for synfuel projects.

Response to Question 3 concerning conditions under which respondents would support energy development indicated that promotion of training and provision of employment for the tribe were ranked highest. Mitigation of social, economic and environmental impacts ranked third. Males between 18 and 44 and females between 35 and 44 were particularly concerned with the need to promote training and receive a fair share of the employment. Females 25 to 34 were also very concerned about mitigation of potential social and economic impacts.

Opposition to development, Question 4, was expressed over non-Indian infringement into the Hill Creek Extension and loss of the environmental quality. Social and economic burdens on the tribe were the next most important concerns. Males between the ages of 18 and 34 were most concerned about the potential for increased trespass in the Hill Creek Extension and degradation of air and water quality. Females between 25 and 34 shared these concerns and were also concerned about additional economic and financial burdens on the tribe as a result of energy related growth.

Seventy-nine percent of the responses to Question 5 were in favor of employment in energy activities, particularly those involving tribal land and minerals. Twenty-one percent of the respondents were not interested in employment opportunities in energy activities. Thirty-five percent of the

Table 2.35 Survey Questions and Responses

1. Are you aware that new energy development projects are being proposed in the Uintah Basin?

55% Yes

45% No

2. What types of energy development projects have you heard are being considered on or near the Reservation and how many people do you think each might employ annually?

Type of project you have heard being proposed	Energy Development Types
51%	Oil and gas production
39%	Oil shale mining and retorting
31%	Tar Sands mining and processing
28%	Coal mining
34%	Power plant construction and operation
20%	Uranium mining and milling

3. Under what conditions would you support energy development on or near the reservation? (Please indicate the three responses that best reflect your feelings - number in importance.)

A. 66% If it will promote training of our people in job skills.

B. 54% If reservation residents will be assured of receiving a "fair share" of the jobs associated with these activities.

C. 29% If there were substantial mineral lease income to the Tribe.

D. 45% If the Tribe and Reservation residents can be assured of being compensated for any environmental, social or economic problems created by the development.

E. 38% If it can be used to improve the economy of the Reservation.

F. 35% If the jobs and income from these energy related activities will provide encouragement for our young people to remain on the Reservation.

G. 2% Other _____

H. 8% I support such development under any conditions.

1% No opinion.

Table 2.35 (Cont'd)

4. Under what conditions would you oppose energy development within the Uintah Basin or on or near the Reservation. (Please indicate the three responses that best reflect your feelings.)

A. 28% If it will mean many more people will come to live in the area.

B. 51% If it imposes a financial burden on the Tribe and our people.

C. 69% If it is likely to lead to poaching or trespassing on the Hill Creek Extension or other areas of our Reservation.

D. 67% If it is likely to lead to environmental problems such as dirtier air or reduced water.

E. 40% If it is likely to lead to overcrowding of the services such as schools shared by Reservation and non-Reservation residents.

F. 7% Other _____

G. 8% I would oppose such development under any conditons.

5. Would you or a member of your household be interested in working in the energy related field?

45% Yes, if it were on the Reservation (North or Southern extension).

34% Yes, if the job was within 60 miles of my home regardless of whether it was on or off the Reservation.

21% No, no one in this household would be interested in working in the energy field.

6. Are there specific areas on or near the Reservation where you feel that energy development (oil and gas, oil shale mining and/or tar sand) should not be allowed under any circumstances?

55% Location 1 South half of the Hill Creek Extension (in Grand County)

33% Location 2 North half of the Hill Creek Extension (in Uintah County)

4% Location 3 Chapita Groves, south of Ouray and east of Green River (in Uintah County)

12% Location 4 Northern block of the Reservation, south of U.S. Highway 40 (in Duchesne, Uintah, and Wasatch Counties)

Table 2.35 (Cont'd)

6. (Cont'd)

32% Location 5 Northern block of the Reservation, north of U.S. Highway 40 (in Duchesne, Uintah, and Wasatch Counties)

2% Other comments

4% Energy development should not be allowed anywhere near or on the Reservation.

6% There are no areas where energy development should not be permitted.

15% Don't know.

7. Many energy developers prefer to house employees in workcamps located near their projects. How would you feel about a temporary camp consisting of dormitories or mobile or modular housing units being constructed on the Reservation and occupied by energy construction and operating workers?

28% I would be in favor if it meant more income to the Reservation.

29% I would be opposed to this under any circumstances.

11% I would be in favor of this under any circumstances.

18% Other _____

15% Don't know.

TO BE FILLED IN BY THE INTERVIEWER IMMEDIATELY AFTER LEAVING THE HOUSEHOLD

The person interviewed was:

48% Male

52% Female

The person interviewed appeared to be how old:

24% 18 - 24

39% 25 - 34

19% 35 - 44

11% 45 - 60

9% Over 60

Table 2.35 (Cont'd)

The person interviewed:	
88%	Seemed to understand each of the questions and answered each care fully and to the best of his/her ability.
11%	Seemed to have difficulty understanding or answering:
33%	Question 1
22%	Question 2
78%	Question 3
67%	Question 4
11%	Question 5
44%	Question 6
11%	Question 7

Source: Duncan, D., *Ute Attitudes Regarding Energy Development in the Uintah Basin*, prepared for the Bureau of Land Management (1983).

respondents are willing to seek employment off the reservation if the commuting distance was not more than 60 miles.

Response to Question 6 about areas on the reservation where development should be restricted was reasonably consistent. Ninety-two percent of the respondents wanted non-Indian infringement prevented in the Hill Creek Extension and 35% identified the northern portion of the northern block as an area requiring preservation of the existing environment. Taking residence of the respondent into consideration, residents of the White Rocks area favored restrictions on development in the northern portion of the northern block more than restrictions on development in the Hill Creek Extension. Fort Duchesne/ Indian Bench area residents favored restrictions on development in the Hill Creek Extension more than in the northern area, as did Randlette/Ouray area residents.

Question 7 was designed to determine the feelings of tribal members with reference to providing housing units on the reservation for non-Indian energy development employees. The general response was that: 39% fully supported or favored the idea if it brought income to the reservation; 29% were totally opposed; and 33% had either no opinion or comments different from those offered on the survey.

Eleven percent of the respondents did not clearly understand the questions. The percent experiencing difficulty, by question, is as follows: Question 1, 33%; Question 2, 22%; Question 3, 78%; Question 4, 64%; Question 5, 11%; Question 6, 44%; and Question 7, 11%. Questions 3 and 4 were most frequently misunderstood.

2.7.5.4 Summary of the Attitude Survey

In summary, the Ute people recognize the fact that energy development will occur near their reservation. Their acceptance of development will be dependent on the size and number of projects and the mitigation of adverse impacts that might occur if such projects are developed. The major concern is that impacts on the tribe be identified and that processes to mitigate such impacts be established.

This survey confirms that Ute society has the same basic concerns found in non-Indian society. For example, males are concerned about employment and recreational opportunities while females concerns seem to center on social and economic conditions that affect the family, as well as employment opportunities.

2.7.6 Summary

This section of the report has outlined existing conditions on the reservation, projected, where possible, population increases, and discussed Ute attitudes towards energy development. If past population trends continue, the reservation will experience growth; that growth is anticipated to be 2.9% per year through 1990. Growth from energy development will occur both within the general boundaries of the reservation and in areas contiguous to the reservation. Some nonreservation communities that are also projected to grow currently rely on the Ute tribe for services. As demands for these services on the reservation grow, new agreements may be necessary. The attitude survey indicates that the Ute society has the same basic concerns that the non-Indian society has regarding the effects of energy developments.

3 DESCRIPTION OF THE REGIONAL TAR SANDS DEVELOPMENT SCENARIOS

This section discusses the manpower requirements and production levels associated with the development of the Special Tar Sands Areas (STSAs). There are two commercialization scenarios that correspond to the potential development alternatives being considered in this report. In the high commercial development scenario, total production is projected to be 365,000 barrels per day (bbl/d). Alternatively, under the low commercial development scenario 107,000 bbl/d would be produced. Both scenarios are composed of company-specific project plans and expected future developments.

For the purposes of this report, the tar sands projects have been grouped into nine potential STSA developments. Only the development effects/impacts of these nine STSAs are directly considered in this report.

Figure 3.1 illustrates the geographic location of the nine STSAs found in the east-central part of Utah. The nine development areas are situated in seven Utah counties: Carbon, Duchesne, Emery, Garfield, Grand, Uintah, and Wayne. The Asphalt Ridge/White Rocks and Raven Ridge/Rimrock STSAs are located in northern Uintah County. Argyle Canyon/Willow Creek is located along the border between Duchesne and Carbon counties. Hill Creek is in southwestern Uintah County, while P.R. Spring extends from southeastern Uintah County into northern Grand County. Sunnyside occupies much of eastern Carbon County. San Rafael Swell is located in central Emery County. Tar Sands Triangle is proportioned between an area in southeastern Wayne County and an area in northeastern Garfield County. Lastly, the Circle Cliffs STSA is located in east-central Garfield County.

Each Special Tar Sands Area has a unique development schedule that extends between the years 1985 and 2005. In addition, this development schedule is often different for the two commercialization scenarios. In the following paragraphs, the direct manpower requirements for each STSA and scenario are discussed.

3.1 DIRECT MANPOWER REQUIREMENTS BY SCENARIO

3.1.1 High Commercial Development Scenario

Under the high commercial development scenario there are assumed to be 11 surface and 8 in-situ tar sands developments. Although total production from these tar sands developments is projected to be 365,000 bbl/d, production is expected to vary significantly by STSA; from 5,000 bbl/d in the Argyle Canyon and Raven Ridge STSAs to 125,000 bbl/d in the Sunnyside STSA.

Table 3.1 shows the annual manpower requirements that would correspond to each STSA, together with the type of projects (in-situ and/or surface) and

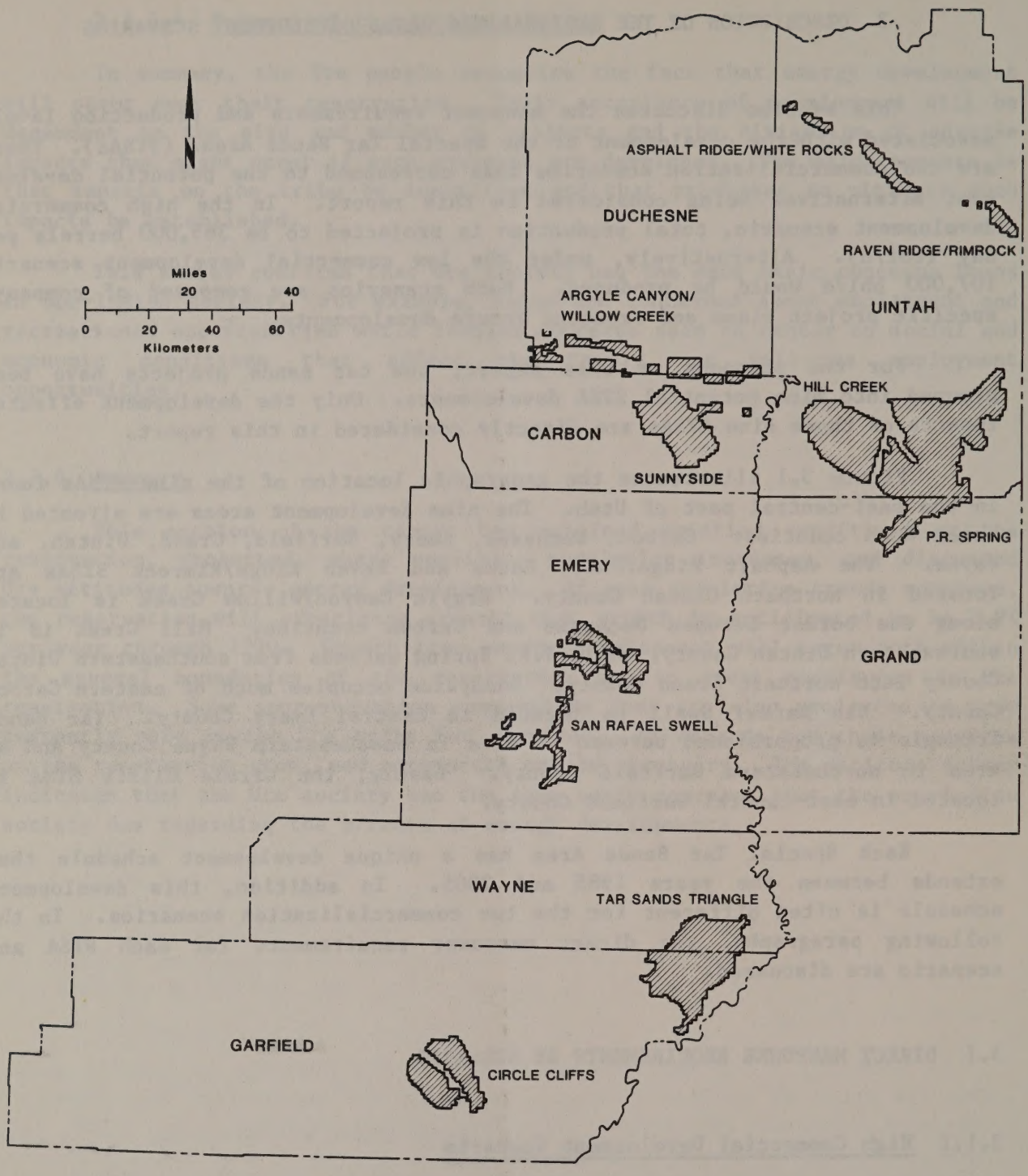

Fig. 3.1 Location of Nine Special Tar Sands Areas in Utah

Table 3.1 Annual Construction and Operation Manpower Requirements by STSA for the High Commercial Development Scenario

STSA	Type and No. of Developments	Cumulative Production (Bbls/Day)		Annual Manpower Requirements																			
				1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Argyle Canyon	Surface (1)	5,000	Construction	–	–	–	–	–	–	100	200	200	100	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	–	50	70	130	130	130	130	130	130	130	130	130	130	130	130	130
			Total	–	–	–	–	–	–	100	250	270	230	130	130	130	130	130	130	130	130	130	130	130	130
Asphalt Ridge and Whiterocks	Surface (2)	10,000	Construction	–	–	200	200	250	150	200	100	100	–	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	50	100	280	300	350	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410
			Total	–	–	250	300	530	450	550	510	510	410	410	410	410	410	410	410	410	410	410	410	410	410
Circle Cliffs	In-situ (1)	20,000	Construction	–	–	–	–	–	–	100	1,000	1,400	400	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	–	–	–	360	360	360	360	360	360	360	360	360	360	360	360	360
			Total	–	–	–	–	–	–	100	1,000	1,400	760	360	360	360	360	360	360	360	360	360	360	360	360
Hill Creek	In-situ (1)	10,000	Construction	–	–	–	–	–	–	–	–	–	100	500	700	600	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	–	–	–	–	–	100	120	120	120	120	120	120	120	120	120	120
			Total	–	–	–	–	–	–	–	–	–	100	500	800	720	120	120	120	120	120	120	120	120	120
P.R. Spring	Surface (2) and In-situ (1)	100,000	Construction	–	50	100	150	240	360	790	1,140	3,600	3,600	3,800	4,700	2,600	1,000	500	–	–	–	–	–	–	–
			Operation	–	–	–	–	50	50	100	100	300	425	670	870	1,320	1,700	1,800	1,900	1,900	1,900	1,900	1,900	1,900	1,900
			Total	–	50	100	150	290	410	890	1,240	3,900	4,025	4,470	5,570	3,920	2,700	2,300	1,900	1,900	1,900	1,900	1,900	1,900	1,900
Raven Ridge	Surface (1)	5,000	Construction	–	–	–	–	–	100	200	200	100	–	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	50	70	130	130	130	130	130	130	130	130	130	130	130	130	130	130
			Total	–	–	–	–	–	100	250	270	230	130	130	130	130	130	130	130	130	130	130	130	130	130
San Rafael	In-situ (1)	20,000	Construction	–	–	–	–	–	50	70	100	200	500	1,000	1,400	700	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	20	70	100	240	240	240	240	240	240	240	240	240	240	240	240	240
			Total	–	–	–	–	–	50	90	170	300	740	1,240	1,640	940	240	240	240	240	240	240	240	240	240
Sunnyside	Surface (4) and In-situ (2)	125,000	Construction	27	27	65	1,982	2,370	3,810	2,510	1,010	210	550	1,050	1,770	1,650	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
			Operation	–	–	–	25	100	1,315	1,465	2,065	2,065	2,160	2,290	2,520	2,645	3,075	3,625	3,645	3,645	4,095	4,595	4,835	5,055	5,075
			Total	27	27	65	2,007	2,470	5,125	3,975	3,075	2,275	2,710	3,340	4,290	4,295	4,125	4,675	4,695	4,695	5,145	5,645	5,885	6,105	6,125
Tar Sand Triangle	Surface (1) and In-situ (2)	70,000	Construction	–	–	–	–	20	50	100	140	500	2,000	2,700	3,000	2,200	1,000	–	–	400	400	400	400	–	–
			Operation	–	–	–	–	7	7	–	–	–	–	200	350	350	700	700	700	700	700	700	960	960	960
			Total	–	–	–	–	27	57	100	140	500	2,000	2,900	3,350	2,550	1,700	700	700	1,100	1,100	1,100	1,360	960	960
All STSAs	Surface (11) and In-situ (8)	365,000	Construction	27	77	365	2,332	2,880	4,520	4,070	3,890	6,310	7,250	9,050	11,570	7,750	3,050	1,550	1,050	1,450	1,450	1,450	1,450	1,050	1,050
			Operation	–	–	50	125	437	1,672	1,985	2,765	3,075	3,855	4,430	5,110	5,705	6,865	7,515	7,635	7,635	8,085	8,585	9,085	9,305	9,325
			Total	27	77	415	2,457	3,317	6,192	6,055	6,655	9,385	11,105	13,480	16,680	13,455	9,915	9,065	8,685	9,085	9,535	10,035	10,535	10,355	10,375

Source: Adapted from unpublished information, Bureau of Land Management, Utah State Office (April 1983).

total production levels for the high commercial development scenario. The construction phase of these STSA projects is projected to begin in 1984 (Sunnyside STSA) and run through the end of the period under study (2005). The earliest operation phase commences in 1986. The last row on Table 3.1 presents the total labor requirements of the nine STSAs. Total manpower requirements for the construction phase is expected to peak at 11,570 workers in 1995. Operation manpower would peak in 2005 when 9,325 people are employed. Overall, total manpower requirements would reach a maximum of 16,680 in 1995.

The individual manpower profiles by STSA are displayed in Fig. 3.2. This three-dimensional graphic depicts the differences in manpower requirements by STSA and year. In Fig. 3.2, the construction phase is clearly identified as the peaked area during the 1990-2000 time frame. The straight line relates the level of operation workers required. The manpower profile, shown in Fig. 3.2, for the Tar Sands Triangle, P.R. Spring, and Sunnyside STSAs identifies the staged development proposed for these areas. In the Tar Sands Triangle STSA, construction manpower is forecast to increase fairly slowly, peak in 1995, then decline until 1999 before beginning to expand again in select years prior to 2005. A somewhat different profile is associated with the P.R. Spring STSA where construction labor is expected to grow each year until 1995; in particular years, employment expands by 1,000 to 2,000 workers. After 1995, employment would slowly taper off until an operations work force level is attained.

The Sunnyside STSA represents the most drastic departure from the other manpower profiles. Employment is projected to increase rapidly between 1984 and 1989 before receding in the following three years. Beginning in 1992, employment is expected to grow continuously through 2005; manpower requirements expand from 2,275 in 1992 to 6,125 in 2005. The Sunnyside STSA is composed of four surface projects and two in-situ projects under the high commercial development scenario.

3.1.2 Low Commercial Development Scenario

The low commercial development scenario represents a much less intense development of the STSAs. Under this scenario there are assumed to be nine surface and eight in-situ developments proposed or planned. Total production for the low commercial development scenario is projected to be 107,000 bbl/d from the tar sands areas. There would be less deviation between the cumulative production from the nine STSAs than under the high commercial scenario. Cumulative production is expected to range from 2,000 bbl/d for the Circle Cliffs STSA to 30,000 bbl/d for the Sunnyside STSA.

Table 3.2 presents the annual manpower requirements by STSA and development phase, together with the type of projects (in-situ and/or surface) and total production levels for the low commercial development scenario. Construction on the first project is expected to commence in 1984 (Sunnyside

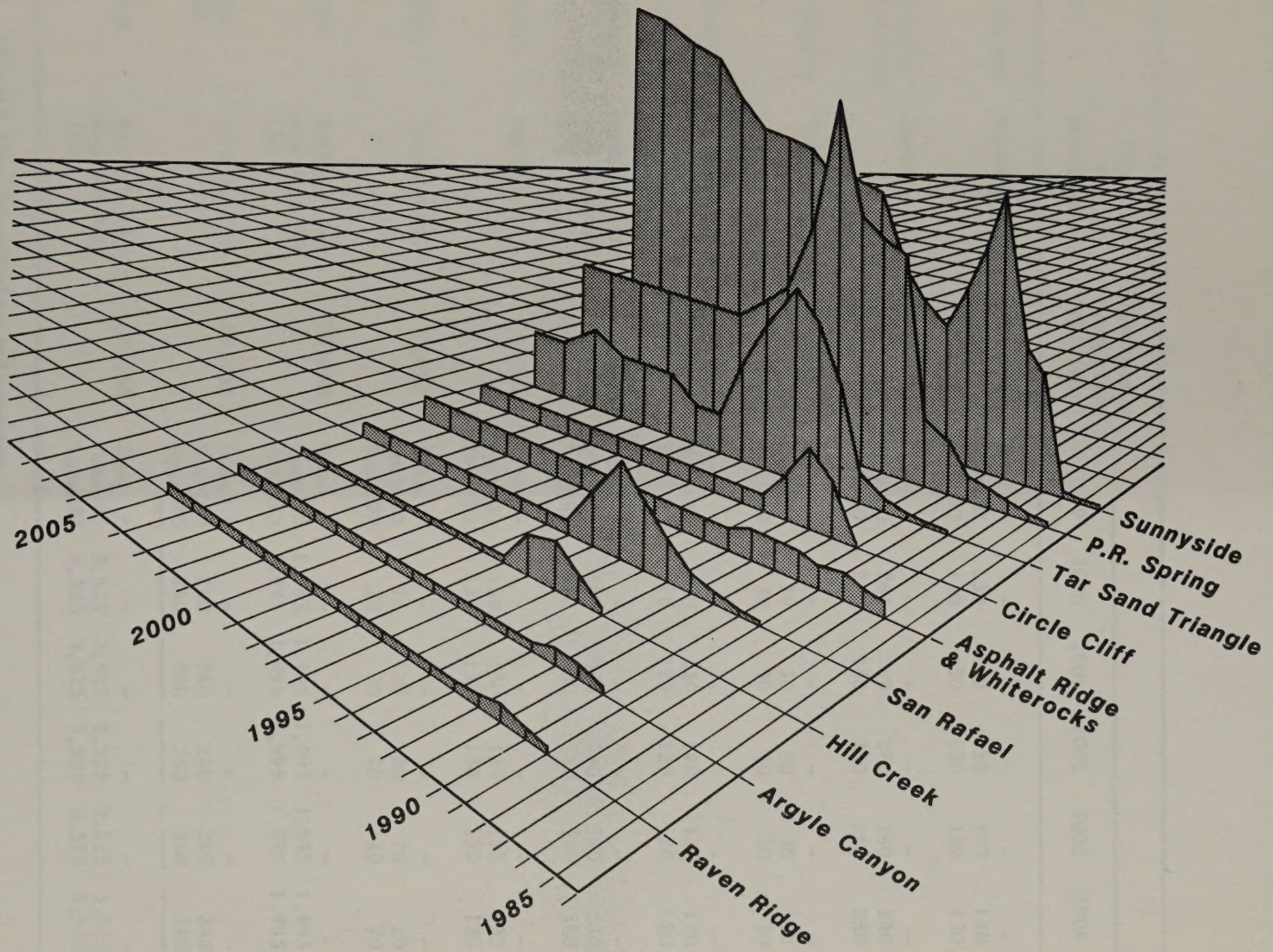

Fig. 3.2 STSA Manpower Profiles for the High Commercial Development Scenario

Table 3.2 Annual Construction and Operation Manpower Requirements by STSA for the Low Commercial Development Scenario

STSA	Type and No. of Developments	Cumulative Production (Bbls/Day)		Annual Manpower Requirements																			
				1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Argyle Canyon	Surface (1)	5,000	Construction	–	–	–	–	–	–	100	200	200	100	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	–	50	70	130	130	130	130	130	130	130	130	130	130	130	130	130
			Total	–	–	–	–	–	–	100	250	270	230	130	130	130	130	130	130	130	130	130	130	130	130
Asphalt Ridge and Whiterocks	Surface (1)	5,000	Construction	–	100	200	200	150	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	50	100	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
			Total	–	100	250	300	430	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
Circle Cliffs	In-situ (1)	2,000	Construction	–	–	–	–	–	–	10	100	140	20	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	–	–	–	30	30	30	30	30	30	30	30	30	30	30	30	30
			Total	–	–	–	–	–	–	10	100	140	50	30	30	30	30	30	30	30	30	30	30	30	30
Hill Creek	In-situ (1)	10,000	Construction	–	–	–	–	–	–	–	–	–	100	500	700	600	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	–	–	–	–	–	100	120	120	120	120	120	120	120	120	120	120
			Total	–	–	–	–	–	–	–	–	–	100	500	800	720	120	120	120	120	120	120	120	120	120
P.R. Spring	Surface (2) and In-situ (1)	25,000	Construction	–	50	100	200	240	440	800	550	150	140	140	200	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	50	80	180	290	320	370	370	580	580	580	580	580	580	580	580	580	580	580
			Total	–	50	100	200	290	520	980	840	470	510	510	780	580	580	580	580	580	580	580	580	580	580
Raven Ridge	Surface (1)	5,000	Construction	–	–	–	–	–	100	200	200	100	–	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	50	70	130	130	130	130	130	130	130	130	130	130	130	130	130	130
			Total	–	–	–	–	–	100	250	270	230	130	130	130	130	130	130	130	130	130	130	130	130	130
San Rafael	In-situ (1)	5,000	Construction	–	–	–	–	–	50	70	35	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			Operation	–	–	–	–	–	–	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
			Total	–	–	–	–	–	50	90	55	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Sunnyside	Surface (4) and In-situ (2)	30,000	Construction	27	27	65	660	660	810	510	210	70	310	400	1,090	1,110	1,050	1,050	–	–	–	–	–	–	–
			Operation	–	–	–	10	40	450	500	650	650	745	810	885	995	1,425	1,975	1,995	1,995	1,995	1,995	1,995	1,995	1,995
			Total	27	27	65	670	700	1,260	1,010	860	720	1,055	1,210	1,975	2,105	2,475	3,025	1,995	1,995	1,995	1,995	1,995	1,995	1,995
Tar Sand Triangle	In-situ (2)	20,000	Construction	–	–	–	–	20	50	100	140	150	700	700	500	700	700	350	–	–	–	–	–	–	–
			Operation					7	7	–	–	–	–	75	120	120	120	240	240	240	240	240	240	240	240
			Total	–	–	–	–	27	57	100	140	150	700	775	620	820	820	590	240	240	240	240	240	240	240
All STSAs	Surface (9) and In-situ (8)	107,000	Construction	27	177	365	1,060	1,070	1,450	1,790	1,435	810	1,370	1,740	2,490	2,410	1,750	1,400	–	–	–	–	–	–	–
			Operation	–	–	50	110	377	817	1,030	1,360	1,470	1,705	1,845	2,275	2,405	2,835	3,505	3,525	3,525	3,525	3,525	3,525	3,525	3,525
			Total	27	177	415	1,170	1,447	2,267	2,820	2,795	2,280	3,075	3,585	4,765	4,815	4,585	4,905	3,525	3,525	3,525	3,525	3,525	3,525	3,525

Source: Adapted from unpublished information, Bureau of Land Management, Utah State Office (April 1983).

STSA), with peak construction requirements projected to occur in 1995 when 2,490 workers would be needed. The first operation phase of any STSA project is currently scheduled to begin in 1986 (Asphalt Ridge/White Rocks STSA). Operation manpower would reach a maximum of 3,525 in 1999, and remain at that level through the end of the period under study.

The last row of Table 3.2 presents the total manpower requirements under the low commercial development scenario. Overall, manpower requirements are expected to peak at 4,905 in 1998, the year in which all construction activities would cease under this scenario.

The individual manpower profiles for the low commercial development scenario are illustrated by STSA in Fig. 3.3. This three dimensional graphic is similar to the one used to depict the high scenario manpower profiles. Moreover, the same interpretation should be used in understanding this figure. It is readily evident that the shape of the manpower profiles displayed in Fig. 3.3, together with their magnitudes, are significantly different than the high scenario development schedules present in Fig. 3.2. A much flatter, and less peaked, low scenario manpower profile is depicted in Fig. 3.3. However, the three STSAs that still deviate from this pattern are the Tar Sands Triangle, P.R. Spring, and Sunnyside STSAs.

The Tar Sands Triangle STSA would vacillate in the level of construction employment required during the time frame 1993-1997, before it would attain a stable operations work force. Similarly, the P.R. Spring STSA would have fluctuations in its construction employment requirements between 1988 and 1996, but they would be much more significant than those expected in the Tar Sands Triangle STSA. Also important to note is the fact that the operations work force projected to be needed in the P.R. Spring STSA is almost equivalent to that of the construction phase employment. Finally, the employment requirements of the Sunnyside STSA are expected to expand at a nearly continuous rate between 1984 and 1998; employment would leap upward between 1984 and 1989 before it would recede slightly, and thereafter the employment requirements would grow continuously until 1998. After 1998, employment is expected to be stable at 1,995 workers during the operations phase of the six projects located in the Sunnyside STSA.

3.2 DIRECT MANPOWER REQUIREMENTS BY STSA

Argyle Canyon

Argyle Canyon is a surface development located on the extreme southern edge of Duchesne County. Under both the high and low commercial development scenarios, the construction phase would run from 1990 through 1993. Two hundred construction workers would be required in 1991 and 1992, and 100 in each of the other years. Operation would require 130 workers, so that in

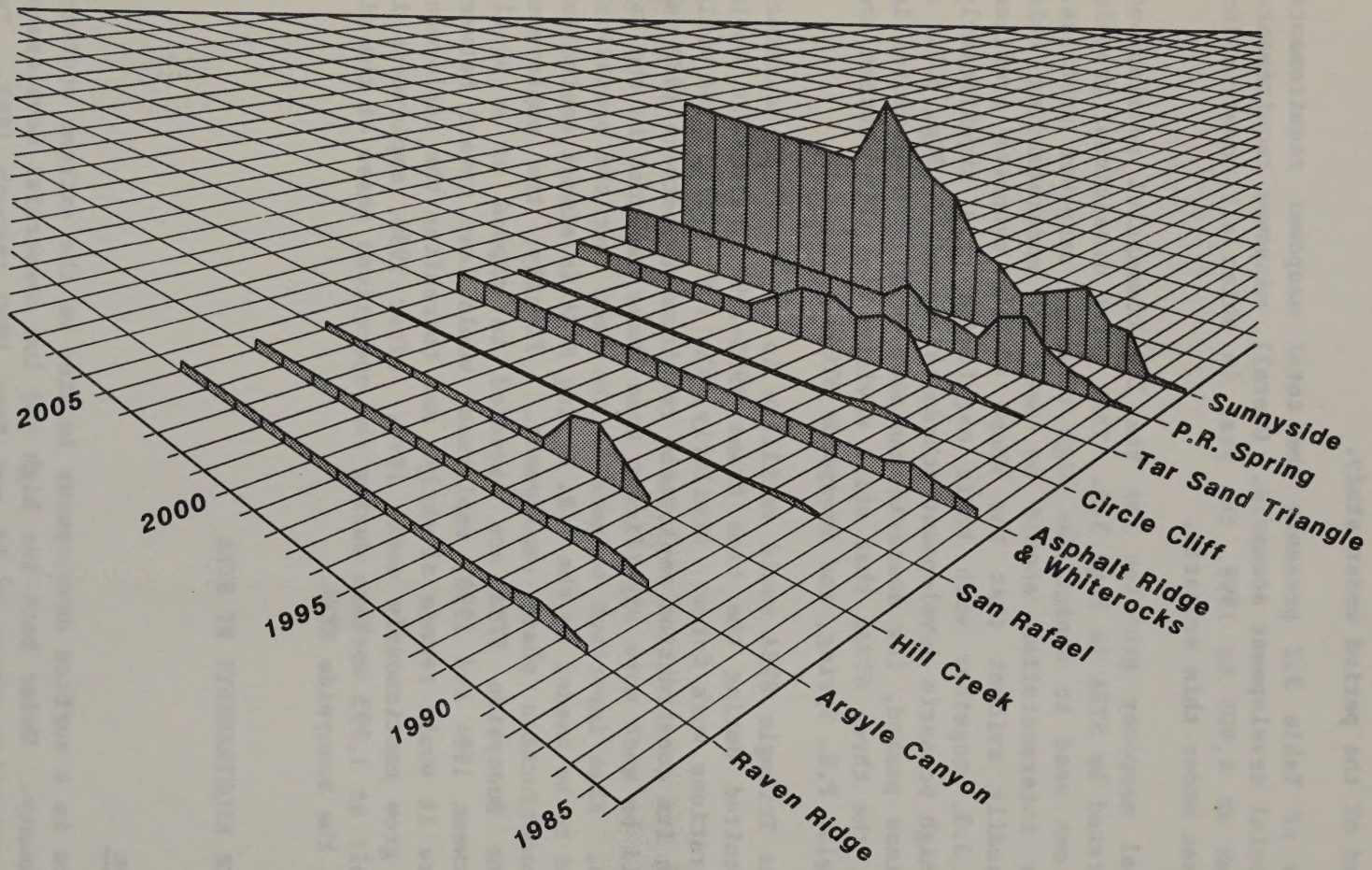

Fig. 3.3 STSA Manpower Profiles for the Low Commercial Development Scenario

1992, a maximum work force of 270 would be necessary. Production is projected to be 5,000 bbl/day.

Asphalt Ridge and White Rocks

The Asphalt Ridge/White Rocks Special Tar Sands Area (STSA) is located in northwestern Uintah County, just south of Vernal. Under the high commercial development scenario, there are two sites, with combined production projected to be 10,000 bbl/d. Construction is expected to begin in 1986, and would run through 1992. During that time, between 100 and 250 workers would be required for construction activities. Operation would also start in 1986, and it is anticipated that 410 workers would be required from 1991 through 2005. The maximum work force would be 550 in 1990.

Under the low scenario there is only one site, and construction would begin in 1985 and run through 1988; between 100 and 200 workers would be required in each year. The operation phase would require 280 workers, so that the largest combined work force would be 430 in 1988. Production under the low scenario is projected to be 5,000 bbl/d.

Circle Cliffs

The Circle Cliffs STSA is located in central Garfield County. It is an in-situ project, with only one development site. Under the high scenario, production is expected to be 20,000 bbl/d. Construction would last from 1990 to 1993, and would require between 100 and 1,400 workers each year. The maximum construction work force of 1,400 is projected to be in 1992. Operation would begin in 1993 and require 360 workers each year.

Under the low development scenario, between 10 and 140 workers would be required each year for construction, with the maximum work force of 140 necessary in 1992. Operation is expected to begin in 1993 and would require 30 workers each year. Production is projected to be 2,000 bbl/d.

Hill Creek

Hill Creek is located in the southwestern corner of Uintah County, both in and around the Uintah-Ouray Indian Reservation. Developments at Hill Creek are projected to be the same under the low and high scenarios. One in-situ project comprises the Hill Creek STSA; production of 10,000 bbl/d is anticipated. Construction would run from 1993 to 1996, and require between 100 and 700 workers each year. Operation would begin in 1995 and require 100 workers in 1995 and 120 thereafter. A maximum work force of 800 is expected in 1995.

P.R. Spring

P.R. Spring would be the second largest development in the area, and is located to the east of Hill Creek in southern Uintah and northern Grand counties. Under the high development scenario, production would reach 100,000 bbl/d from the two surface projects and one in-situ project planned for the P.R. Spring STSA. Construction would begin in 1985, and run through 1998. The 4,700 workers that would be required for construction in 1995 would represent the largest construction force for any site in the region. Operation is expected to begin in 1988, when only 50 workers would be needed. By 1999, this number would have reached 1,900, and would remain at that level for the remainder of the period. Peak labor requirements under the high scenario are anticipated in 1995, when 5,570 workers would be needed.

Development of the P.R. Spring STSA under the low commercial development scenario would include three tar sands projects and attain a cumulative production level of 25,000 bbl/d. Between 50 and 800 workers would be required each year for construction, with a peak work force of 800 necessary in 1990. Construction activities would extend from 1985 to 1995. The operations work force of the low scenario is expected to begin in 1988 with 50 workers. This work force level would climb until it reaches a peak of 580 workers in 1995. This peak work force level would continue through 2005.

Raven Ridge

The Raven Ridge STSA is located in east-central Uintah County, and the developments here would be the same under the high and low scenarios. There is one surface development at Raven Ridge, with production projected to be 5,000 bbl/d. This development would have exactly the same manpower requirements as the development at Argyle Canyon. Construction would last four years -- from 1989 to 1992 -- and require between 100 and 200 workers each year. Operation is expected to begin in 1990, and would require 130 workers from 1992 through 2005. The work force of 270 in 1991 would be the largest for this site in the 20 years under study.

San Rafael

The San Rafael STSA is located in central Emery County, and under the high scenario, production would be 20,000 bbl/d. Construction is projected to last from 1989 to 1996, and would require up to 1,400 workers. Operation would begin in 1990 and after 1993, 240 workers would be required. In 1995, the work force requirements would peak at 1,640.

Under the low scenario, construction would last three years and require 35 to 70 workers. Operation is expected to start in 1990 -- the year after construction begins -- and require 20 workers each year. Production under the low scenario is projected to be 5,000 bbl/d.

Sunnyside

Sunnyside would be the largest development planned in the region, and is located in eastern Carbon County. In this STSA, there are four surface and two in-situ sites. Under the high scenario, construction would run from 1984 through 2005, with a maximum of 3,810 construction workers needed in 1989. From 1997 to 2005, 1,050 workers would be needed for construction each year. Operation would begin in 1987, when only 25 workers are required. This figure would rise quickly, so that by 2005, 5,075 workers would be required for operation, the highest number for the period. The combined work force in 2005 is expected to be 6,125 -- the largest work force in the region. Projected production in the Sunnyside STSA would be 125,000 bbl/d. This level of production would make it the largest development in the region.

Under the low scenario, production would be 30,000 bbl/d. Construction would commence in 1984, but not end until 1998. Up to 1,110 workers would be needed for construction. The operation phase is expected to begin in 1987, with 10 workers required. This demand would increase each year until 1999, when operations would require 1,995 workers. The largest work force would be required in 1998, when 3,025 workers would be needed.

Tar Sands Triangle

The Tar Sands Triangle is located on the Wayne-Garfield County border in the eastern part of each county. Under the high scenario, there would be one surface and two in-situ sites, with a combined production projected to be 70,000 bbl/d. Construction manpower requirements would fluctuate: only 20 would be required in 1988, whereas 3,000 would be needed in 1995. In 1998 and 1999, no workers would be needed for construction. Seven workers would be required for operation in 1988 and 1989, but then none would be needed again until 1994, when 200 would be required. The operation phase would require 960 workers from 2003 to 2005.

Under the low scenario, there would be two in-situ sites and no surface sites. Construction is expected to run from 1988 to 1998, employing up to 700 workers in any one year. Operation would run from 1988 to 1989, and then again from 1994 through 2005. Up to 240 workers would be needed for operation. The largest work force required for this development would be 820 in 1996 and 1997. Production under the low scenario is projected to be 20,000 bbl/d.

4 REGIONAL SOCIOECONOMIC IMPACT ANALYSIS OF TWO TAR SANDS DEVELOPMENT SCENARIOS

The socioeconomic impact of tar sands development in Utah is discussed in this section. Two different scenarios of tar sands commercial development are used here; a high commercial development scenario and a low commercial development scenario. These scenarios are based on the manpower profiles described in Sec. 3. The development impacts of the nine STSAs are presented for the region as a whole, each of the seven counties, and in the case of population and households, CCDs and communities. Projections are included for the window years of 1985, 1990, 1995, 2000, and 2005.

Section 4.1 addresses the regional and county-specific socioeconomic impacts generated by the high scenario while Sec. 4.2 contains a similar discussion for the low scenario.

4.1 HIGH COMMERCIAL DEVELOPMENT SCENARIO: DESCRIPTION OF IMPACTS

The projected impacts of the high commercial development scenario are described in this section. Two important assumptions underlie these projections. The first assumption is that the baseline projections (described in Sec. 2) would accurately reflect the socioeconomic composition of the counties in the time periods under study. The second assumption is that the manpower requirements of the tar sands projects (described in Sec. 3) would not change. Given these assumptions, the following analysis is based on the difference between the baseline projections and the projections of the high commercial development scenario.

4.1.1 Total Regional Impact on Socioeconomic Development Factors

The projected impacts of the high commercial tar sands development scenario on the region are described in this section. A general summary of the socioeconomic impacts on the region is presented in Table 4.1. The projected impacts are expressed in terms of the difference between the baseline projections and the high commercial development scenario. Cumulative growth factors are presented in Table 4.1, along with the actual levels, to show the magnitude of change projected to occur between 1985 and 2005.

It is projected that the population of the region would grow from 213 more than the baseline in 1985 to 45,681 above the baseline in 2005. This growth corresponds to 214 times the high scenario population level projected for 1985. This population growth would be attributable to the tar sands developments proposed under the high commercial scenario. The change in population would reach a peak of 53,091 in 1995.

Table 4.1 Summary of Regional Socioeconomic Impacts by Category and Window Year for the High Commercial Development Scenario

Socioeconomic Development Category	Change from Baseline, by Year					Cumulative Growth Factor[a]	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Population								
Total	213	18,267	53,091	37,369	45,681	214.46	73.65	-1.49
School-Age	41	3,743	12,463	9,959	13,255	323.29	77.13	0.62
Retirement-Age	0	314	918	1,241	1,499	-[b]	-[b]	5.03
Employment (No. of jobs)	111	9,323	26,086	16,182	19,236	173.30	72.63	-3.00
Households	77	6,553	17,241	11,038	13,205	171.49	71.79	-2.63
Infrastructure Requirements								
Housing								
Single family units	47	3,935	10,347	6,625	7,926	168.64	71.50	-2.63
Multifamily units	13	987	2,590	1,659	1,983	152.54	69.80	-2.64
Mobile homes	20	1,642	4,312	2,764	3,305	165.25	71.15	-2.62
Education								
Students	41	3,743	12,463	9,959	13,255	323.29	77.13	0.62
Classrooms	3	154	503	402	534	178.00	66.89	0.60
Teachers	3	154	503	402	534	178.00	66.89	0.60
Health Care								
Hospital beds								
General care	3	40	111	79	95	31.67	43.49	-1.54
Long-term care	0	17	41	52	62	-[b]	-[b]	4.22
Medical personnel								
Doctors	3	15	35	26	30	10.00	27.84	-1.53
Dentists	3	13	29	22	26	8.67	25.46	-1.09
Nurses	3	35	95	66	81	27.00	41.27	-1.58
Public health nurses	3	9	16	11	13	4.33	18.22	-2.06
Mental health care								
Clinical psychologists	3	7	7	7	8	2.67	8.84	1.34
Mental health workers	3	8	10	8	9	3.00	12.79	-1.05
Public Safety								
Law enforcement								
Police officers	3	40	111	79	95	31.67	43.49	-1.54
Patrol cars	3	40	111	79	95	31.67	43.49	-1.54
Jail space (sq ft)	107	9,136	26,547	18,686	22,843	213.48	73.56	-1.49
Juvenile holding cells	3	8	11	9	11	3.67	13.87	0
Fire Protection								
Water flow (gpm)/ duration (hr)[c]								
Emergency Medical Service								
Ambulances	3	9	16	11	13	4.33	18.22	-2.06
Emergency medical technicians	21	63	112	77	91	4.33	18.22	-2.06
Utility Service Demands								
Water system								
Connections	70	5,897	17,130	12,059	14,739	210.56	73.33	-1.49
Supply (10^6 gal/d)	0.1	9.4	27.4	19.3	23.6	209.95	73.33	-1.49
Storage (10^6 gal/d)	0.1	4.7	13.7	9.7	11.8	215.20	73.33	-1.49
Treatment (10^6 gal/d)	0.1	9.4	27.4	19.3	23.6	209.95	73.33	-1.49
Sewage system (10^6 gal/d)	0.1	1.8	5.3	3.7	4.6	208.38	73.15	-1.50
Solid waste[d]								

Table 4.1 (Cont'd)

Socioeconomic Development Category	Change from Baseline, by Year					Cumulative Growth Factor[a]	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Other Services								
Parks (acres)	3	113	323	228	276	92.00	59.66	-1.56
Libraries								
Books	426	36,534	106,182	74,738	91,362	214.46	73.65	-1.49
Space (sq ft)	107	9,136	26,547	18,686	22,843	213.49	73.56	-1.54

[a]Computed as the ratio between 1985 and 2005.

[b]Undefined.

[c]Fire protection measured in water flow (gpm)/duration (hr) cannot be aggregated across the affected counties. See Tables 4.22-4.28 for county-specific detail.

[d]The State of Utah community facility guidelines do not include a solid waste standard. Therefore, an estimate of solid waste disposal impacts could not be determined.

Table 4.1 shows that, unlike total population, the change in school-age population and retirement-age population would increase between 1995 and 2005. School-age population in the region would grow from 41 more than baseline in 1985 to 13,255 above the baseline in 2005, while retirement-age population would increase from being negligible relative to the baseline in 1985 to 13,205 above the baseline in 2005. The change in the number of households would grow 71.79% annually from 1985 to 1995 but then decline 2.63% annually from 1995 to 2005.

The change in the school-age population would create a demand for three more teachers and classrooms than the baseline in 1985, rising to 534 more teachers and classrooms than the baseline in 2005 (Table 4.1). The change in housing demands would increase more rapidly for single-family homes than for multifamily or mobile homes between 1985 and 1995, but the change in all three types of housing would decrease at an annual rate of 2.6% from 1995 to 2005.

Total regional employment is also projected to grow rapidly over the baseline during the 1985-2005 period. In particular, employment would expand from 111 additional workers in 1985 to 19,236 in 2005. This 2005 employment level is 173 times that projected to be required in 1985. Again, this increase would be most dramatic from 1985 to 1995. In this period, total employment would rise 72.63% annually; in the next 10 years there would actually be a negative change, -3.00% annually. Regional employment growth by industrial sector is described in Sec. 4.1.1.1.

Three more general care hospital beds than the baseline demand are projected to be needed in 1985, rising to 111 beds in 1995 and then falling to 95 beds in 2005. The change in long-term care hospital beds will grow from

zero in 1985 to a high of 62 in 2005. In 1985, three more doctors, dentists, nurses, public health nurses, clinical psychologists, and mental health workers would be needed in addition to the baseline projections. By 2005, the changes in the demand for medical personnel would increase to 30 doctors, 26 dentists, 81 nurses, 13 public health nurses, 8 clinical psychologists, and 9 mental health workers. All of these additional infrastructure service demands would be needed to satisfy the population growth projected to accompany the realization of the high commercial development scenario.

The change in the demand for public safety services would increase at varying rates. The greatest increase would occur in jail space, which would grow from 107 sq ft more than baseline in 1985 to 22,843 sq ft more than baseline in 2005. During the same period the following growth is projected; the change in the number of police officers and patrol cars would increase from 3 to 95, the change in the number of emergency medical technicians would increase from 21 to 91; and the change in the number of juvenile holding cells would increase from 3 to 11. In each case, the demand for these services would peak in 1995 and decline between 1995 and 2000.

The change in the utility service demands is projected to increase 73.3% annually from 1985 to 1995 and then decrease 1.5% annually from 1995 to 2005. In 2005, water system demands -- in addition to baseline -- would total 14,739 connections to the water system, 23.6 million gallons of water supply and treatment per day, and 11.8 million gallons of water storage per day. Sewage system demands would total 4.6 million gallons per day.

The demand for park services would shift from three acres more than baseline in 1985 to 323 acres more than baseline in 1995 to 276 acres more than baseline in 2005. The change in the demand for library books and space would increase at an annual rate of 74% between 1985 and 1995 and decrease at an annual rate of 1.5% thereafter. A total of 91,362 books and 22,843 sq ft of space in addition to baseline would be needed in 2005.

4.1.1.1 Regional Employment Impacts by Sector

Table 4.2 shows that the change in regional employment would grow from 111 in 1985 to 26,086 in 1995. After 1995, the change in employment would decrease 3% annually, reaching a total of 19,236 in 2005. The most rapid increases in the change in employment between 1985 and 1995 would occur in the nonfarm proprietors sector (59.12% annually) and the mining sector (58.91% annually). In the 1995 to 2005 period, contract construction employment would drop from 12,101 more than baseline to 1,535 more than baseline. Employment in the agriculture sector would remain at the baseline level throughout the 20 year period. Contract construction would account for the greatest portion of the total change in employment in 1990 and 1995, followed by mining, government, and wholesale and retail trade. Mining would account for just less than half of the total change in employment in the region in 2000 and 2005. Government, wholesale and retail trade, contract construction, nonfarm

Table 4.2 Total Regional Employment Impacts by Industrial Sector as a Result of the High Commercial Development Scenario[a]

Industry Sector	Change in Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	1,992	5,134	7,652	9,346	58.91	6.17
Contract Construction	79	4,268	12,101	1,845	1,535	45.48	-18.66
Manufacturing	0	57	157	115	142	54.70	-1.00
Transportation, Communication, and Public Utilities	2	141	396	299	370	49.71	-0.68
Wholesale and Retail Trade	9	817	2,314	1,703	2,100	52.51	-0.97
Finance, Insurance, and Real Estate	2	119	339	259	321	49.69	-0.54
Services	5	523	1,467	1,138	1,419	52.20	-0.33
Government	10	889	2,617	2,018	2,571	52.29	-0.18
Nonfarm Proprietors	6	535	1,561	1,153	1,432	59.12	-0.86
Total	111	9,341	26,086	16,182	19,236	49.75	-3.00

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

proprietors, and services would each have at least 1,000 more employees than the baseline projection in 2000 and 2005.

4.1.1.2 Regional Impact on Total Wage and Personal Income

The total regional wage and personal income effects of the high scenario tar sands projects are presented in Table 4.3. The wage and income data are presented by industrial sector and income category. Average monthly wages are assumed to have an approximate annual increase of 1.72%, independent of the scenario-defined tar sands projects. The number of employees and total wage payments would increase as a result of the tar sands developments considered and are expressed as a change from the baseline projections. The key industrial sectors forecast to grow are briefly discussed in the following paragraphs.

The change in total monthly personal income in the region would grow from $0.3 million in 1985 to $75.8 million in 1995. Between 1995 and 2005 the

Table 4.3 Total Regional Wage and Personal Income Impact Projections by Industrial Sector as a Result of the High Commercial Development Scenario[a]

Industrial Sector	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Mining							
Average Monthly Wage (1980 $)	2,157	2,349	2,559	2,787	3,036	1.72	1.72
Change from Baseline							
Number of Employees	0	1,994	5,136	7,653	9,347	-[b]	6.17
Total Wage Payment (1980 $)	0	4,683,906	13,143,024	24,328,911	28,377,492	-[b]	12.41
Construction							
Average Monthly Wage (1980 $)	2,625	2,859	3,114	3,367	3,695	1.72	1.73
Change from Baseline							
Number of Employees	79	4,255	12,138	1,859	1,550	74.88	-18.60
Total Wage Payment (1980 $)	207,375	12,165,045	37,797,732	6,259,253	5,727,250	68.29	-17.20
Manufacturing							
Average Monthly Wage (1980 $)	893	973	1,060	1,154	1,257	1.73	1.72
Change from Baseline							
Number of Employees	1	61	182	126	155	68.27	-1.59
Total Wage Payment (1980 $)	893	59,353	192,920	145,404	194,835	71.18	0.10
Transportation, Communications, and Utilities							
Average Monthly Wage (1980 $)	1,879	2,047	2,296	2,501	2,724	2.02	1.72
Change from Baseline							
Number of Employees	2	151	459	326	400	72.22	-1.37
Total Wage Payment (1980 $)	3,758	309,097	1,053,864	815,326	1,089,600	75.70	0.33
Wholesale and Retail Trade							
Average Monthly Wage (1980 $)	844	919	1,002	1,091	1,188	1.73	1.72
Change from Baseline							
Number of Employees	11	860	2,591	1,819	2,230	72.67	-1.49
Total Wage Payment (1980 $)	9,284	790,340	2,596,182	1,984,529	2,649.240	75.65	0.20
Finance, Insurance, and Real Estate							
Average Monthly Wage (1980 $)	925	1,007	1,097	1,195	1,302	1.72	1.73
Change from Baseline							
Number of Employees	2	127	395	284	349	69.65	-1.23
Total Wage Payment (1980 $)	1,850	127,889	433,315	339,380	454,398	72.57	0.48
Services							
Average Monthly Wage (1980 $)	767	835	910	991	1,079	1.72	1.72
Change from Baseline							
Number of Employees	7	567	1,761	1,281	1,578	73.81	-1.09
Total Wage Payment (1980 $)	5,369	473,445	1,602,510	1,269,471	1,702,662	76.80	0.61
Government							
Average Monthly Wage (1980 $)	931	1,014	1,144	1,246	1,357	2.08	1.72
Change from Baseline							
Number of Employees	12	927	2,893	2,138	2,711	73.07	-0.65
Total Wage Payment (1980 $)	11,172	939,978	3,309,592	2,663,948	3,678,827	76.67	1.06
Nonfarm Proprietors (NFP)							
Average Monthly Wage (1980 $)	1,230	1,340	1,459	1,590	1,731	1.72	1.72
Change from Baseline							
Number of Employees	8	563	1,741	1,228	1,516	71.31	-1.37
Total Wage Payment (1980 $)	9,840	754,420	2,540,119	1,952,520	2,624,196	74.26	0.33
Other Labor Income (OLI)							
Average Monthly OLI (1980 $)	106	115	126	137	149	1.74	1.69
Change from Baseline							
Number of Recipients	118	9,305	27,079	16,722	19,899	72.22	-3.03
Total OLI (1980 $)	12,508	1,070,075	3,411,954	2,290,914	2,964,951	75.22	-1.39

Table 4.3 (Cont'd)

Industrial Sector	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Average Property Income (1980 $)	141	156	170	185	202	1.89	1.74
Population	247	18,889	56,900	38,652	47,150	72.28	-1.86
Total Property Income (1980 $)	34,827	2,946,684	9,673,000	7,150,620	9,524,300	75.54	-0.15
Total Monthly Personal Income (1980 $)	296,876	24,320,232	75,754,212	46,200,276	58,987,751	74.05	-2.47
Average Monthly Per Capita Income (1980 $)	1,202	1,288	1,331	1,195	1,251	1.02	-0.62

[a]The number of employees by industrial sector presented in this table may not equal the total industrial sector employment presented in Table 4.2 because these personal income projections may include communities that are not in the critical impact area (i.e., do not satisfy the 5% growth criteria).

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

change will fall to $59.0 million. Wages would account for about 80% of the change in total monthly personal income; property income and other labor income would account for the other 20%.

Employees in the construction sector would have the highest change in total wage payments in 1985, 1990, and 1995. The construction sector would also have the largest change in average monthly wages throughout the 20 year period. Employees in the mining sector would have the highest change in total wage payments in 2000 and 2005. The change in the average monthly wage in the service sector would increase from $767 in 1985 to $1,079 in 2005. In each window year, the change in the monthly wage in the service sector would be the lowest of any sector.

4.1.2 County-Level Socioeconomic Impact Analysis of the Nine STSA Developments

The projected impacts on each county of the tar sands projects proposed in the high commercial development scenario on each county are described in this section. Population, household, economic base, employment, housing, public and private infrastructure, and Indian reservation impacts are discussed. In each instance, the impacts are expressed in terms of the difference between the projections under the baseline scenario and the high commercial development scenario.

4.1.2.1 Population and Housing Impacts

Figure 4.1 illustrates the change in population that would occur in each county due to the high commercial tar sands development scenario. A summary of the population and household impacts in each county is presented in Table 4.4. Further detail of the potential population and household impacts by community and CCD can be found in Tables 4.5 through 4.11. Only those CCDs where significant changes would occur are included separately, but all CCDs are included in the county totals presented in this table. All projections are presented as a change from the baseline forecast and thus reflect only the population and household growth attributable to the development of the high commercial scenario projects in the region.

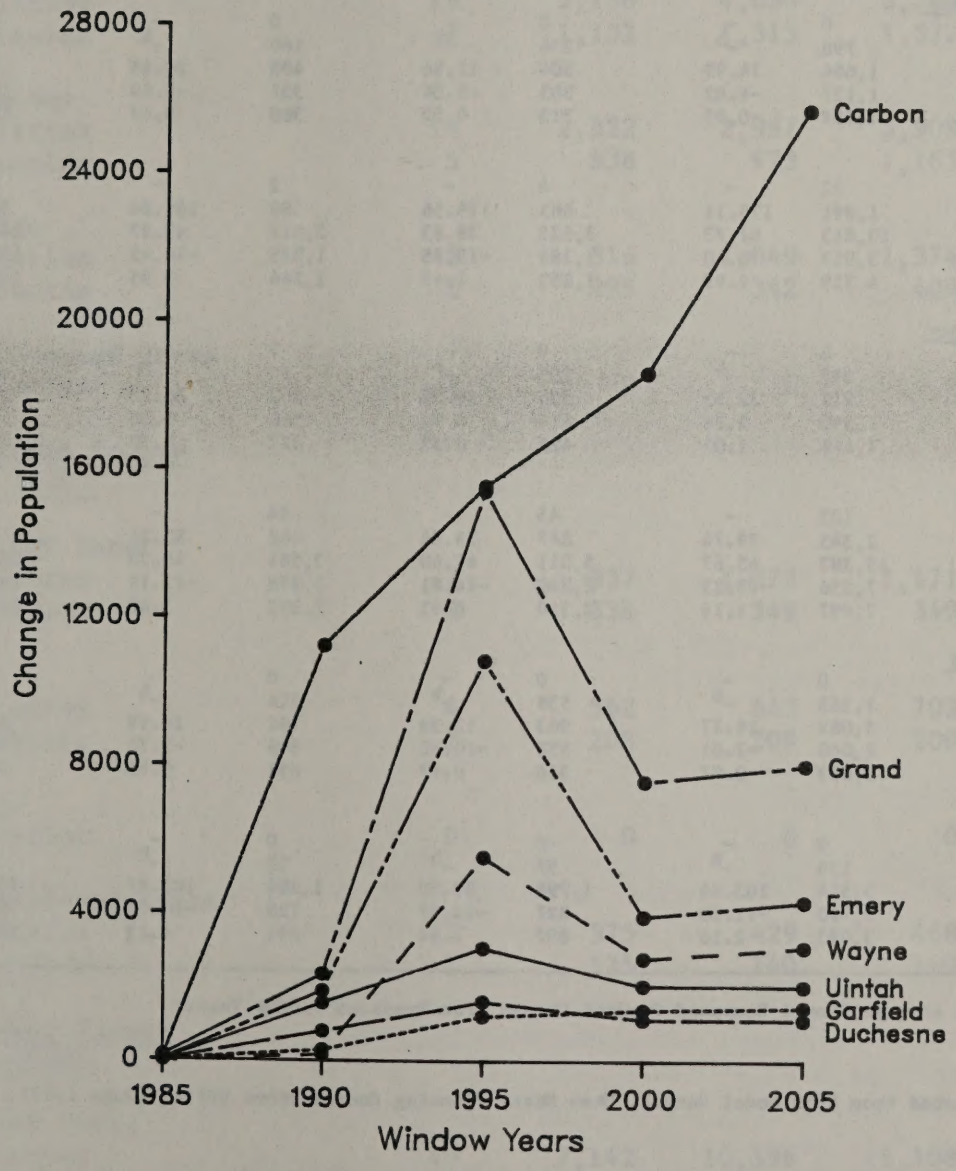

Fig. 4.1 Change in County Populations Due to the High Commercial Development Scenario

Table 4.4 Summary of Population and Household Impact Projections by County due to the High Commercial Development Scenario

County and Window Years	Population		New Households		School-Age Population		Retirement-Age Population	
	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]
Carbon County								
1985	76	-	28	-	15	-	0	-
1990	11,217	171.53	4,049	170.42	2,305	173.73	216	-[b]
1995	15,503	6.69	5,050	4.52	3,609	9.38	288	5.92
2000	18,563	3.67	5,525	1.81	4,861	6.14	658	17.97
2005	25,649	6.68	7,434	6.12	7,385	8.72	867	5.67
Duchesne County								
1985	0	-	0	-	0	-	0	-
1990	798	-[b]	274	-[b]	160	-[b]	3	-[b]
1995	1,604	14.98	504	12.96	409	20.65	7	18.47
2000	1,127	-6.82	305	-9.56	357	-2.68	10	7.39
2005	1,124	-0.05	313	0.52	360	0.17	22	17.08
Emery County								
1985	12	-	4	-	2	-	0	-
1990	1,891	175.11	683	179.56	389	186.94	36	-[b]
1995	10,813	41.73	3,522	38.83	2,517	45.27	201	41.05
2000	3,913	-18.40	1,165	-19.85	1,025	-16.45	139	-7.11
2005	4,319	1.99	1,252	1.45	1,244	3.95	146	0.99
Garfield County								
1985	0	-	0	-	0	-	0	-
1990	292	-[b]	105	-[b]	60	-[b]	6	-[b]
1995	1,212	32.93	395	30.34	282	36.28	22	29.67
2000	1,390	2.78	414	0 94	364	5.24	49	17.37
2005	1,466	1.07	425	0.53	422	3.00	50	0.40
Grand County								
1985	125	-	45	-	24	-	0	-
1990	2,345	79.74	847	79.86	482	82.21	45	-[b]
1995	15,383	45.67	5,011	42.69	3,581	49.35	285	44.65
2000	7,556	-13.25	2,249	-14.81	1,978	-11.19	268	-1.22
2005	7,997	1.14	2,318	0.61	2,302	3.08	270	0.15
Uintah County								
1985	0	-	0	-	0	-	0	-
1990	1,565	-[b]	538	-[b]	314	-[b]	5	-[b]
1995	3,062	14.37	963	12.35	781	19.99	13	21.06
2000	2,040	-7.81	553	-10.50	646	-3.72	18	6.72
2005	2,033	-0.07	566	0.47	651	0.15	39	16.72
Wayne County								
1985	0	-	0	-	0	-	0	-
1990	159	-[b]	57	-[b]	33	-[b]	3	-[b]
1995	5,514	103.24	1,796	99.38	1,284	107.97	102	102.44
2000	2,780	-12.80	827	-14.37	728	-10.73	99	-0.60
2005	3,093	2.16	897	1.64	891	4.12	105	1.18

[a]Computed as Average Annual Compound Percent Change from Previous Window Year.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.5 Population and Household Impact Projections by Community for Carbon County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
East Carbon Census County Division (CCD)					
East Carbon CCD Total					
Population	19	3,138	4,036	5,283	7,391
Households	7	1,133	1,315	1,572	2,142
East Carbon					
Population	14	2,322	2,987	3,909	5,469
Households	5	838	973	1,163	1,585
Sunnyside					
Population	5	816	1,049	1,374	1,922
Households	2	295	342	409	557
Unincorporated Areas					
Population	0	0	0	0	0
Helper Census County Division (CCD)					
Helper CCD Total					
Population	7	937	1,072	1,171	1,548
Households	3	338	349	349	449
Helper					
Population	4	562	643	703	929
Households	2	203	209	209	269
Scofield					
Population	0	0	0	0	0
Unincorporated Areas					
Population	3	375	429	468	619
Households	1	135	140	140	180
Price Census County Division (CCD)					
Price CCD Total					
Population	49	7,142	10,396	12,108	16,711
Households	18	2,578	3,386	3,604	4,844

Table 4.5 (Cont'd)

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Price Census County Division (CCD) (Cont'd)					
Price					
Population	32	4,642	6,757	7,870	10,862
Households	12	1,676	2,201	2,343	3,149
Wellington					
Population	9	1,286	1,871	2,179	3,008
Households	3	464	609	649	872
Hiawatha					
Population	0	0	0	0	0
Unincorporated Areas					
Population	8	1,214	1,767	2,058	2,841
Households	3	438	576	613	823

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Carbon County

Carbon County is forecast to experience the greatest growth in population within the region under the high commercial development scenario. By 2005, the population in Carbon County would be 25,649 more than the baseline population in the same year. Most of this growth would take place between 1985 and 1990, when the increase is expected to be 171.53% annually. After 1990, the annual increases would be less than 7%. The data in Table 4.4 illustrate that similar increases would occur in the number of new households and in the school-age population. The change in retirement-age population would grow from zero in 1985 to 867 in 2005.

Table 4.6 Population and Household Impact Projections by Community for Duchesne County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Duchesne Census County Division (CCD)					
Duchesne CCD Total					
Population	0	129	228	249	248
Households	0	44	72	67	69
Duchesne					
Population	0	129	228	249	248
Households	0	44	72	67	69
Unincorporated Areas					
Population	0	0	0	0	0
Roosevelt Census County Division (CCD)					
Roosevelt CCD Total					
Population	0	669	1,376	878	876
Households	0	230	433	238	244
Roosevelt					
Population	0	401	826	527	526
Households	0	138	260	143	146
Myton					
Population	0	20	41	26	26
Households	0	7	13	7	7
Unincorporated Areas					
Population	0	248	509	325	324
Households	0	85	160	88	90

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.7 Population and Household Impact Projections by Community for Emery County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Castle Dale-Huntington Census County Division (CCD)					
Castle Dale-Huntington CCD Total					
Population	8	1,178	3,658	1,752	2,287
Households	3	425	1,192	521	663
Castle Dale					
Population	3	412	1,280	613	800
Households	1	149	417	182	232
Cleveland					
Population	0	71	219	105	137
Households	0	26	72	31	40
Elmo					
Population	0	47	146	70	91
Households	0	17	48	21	27
Huntington					
Population	2	295	915	438	572
Households	1	106	298	130	166
Orangeville					
Population	2	295	915	438	572
Households	1	106	298	130	166
Unincorporated Areas					
Population	0	59	183	88	114
Households	0	21	60	26	33
Emery-Ferron Census County Division (CCD)					
Emery-Ferron CCD Total					
Population	0	77	1,220	244	260
Households	0	28	397	73	75
Clawson					
Population	0	0	0	0	0

Table 4.7 (Cont'd)

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Emery-Ferron Census County Division (CCD) (Cont'd)					
Emery					
Population	0	19	305	61	65
Households	0	7	99	18	19
Ferron					
Population	0	58	915	183	195
Households	0	21	298	55	56
Unincorporated Areas					
Population	0	0	0	0	0
Green River Census County Division (CCD)					
Green River CCD Total					
Population	4	635	5,935	1,917	1,771
Households	1	229	1,933	571	513
Green River					
Population	3	546	5,104	1,649	1,523
Households	1	197	1,662	491	441
Unincorporated Areas					
Population	1	89	831	268	248
Households	0	32	271	80	72

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.8 Population and Household Impact Projections by Community for Garfield County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Escalante Census County Division (CCD)					
Escalante CCD Total					
Population	0	292	1,212	1,390	1,466
Households	0	105	395	414	425
Boulder					
Population	0	29	121	139	147
Households	0	11	40	41	43
Escalante					
Population	0	263	1,091	1,251	1,319
Households	0	95	356	373	383
Unincorporated Areas					
Population	0	0	0	0	0

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.5 identifies that the most rapid growth would be in the East Carbon CCD, where the change in population would increase from 19 over the baseline in 1985 to 7,391 in 2005. The cities of East Carbon and Sunnyside would account for all of the growth in the CCD, with most of this growth taking place between 1985 and 1990. There would be no change in the population of the unincorporated areas in the East Carbon CCD. The largest change in the county is expected to occur in the Price CCD, where the change in population would jump from 49 over the baseline in 1985 to 16,711 in 2005. Most of this change in population would occur in Price, while Wellington and the unincorporated areas would account for equal, but lesser, portions of the change. The Helper CCD would change less than, and at slower rates than, the rest of the county. The change in population due to the

Table 4.9 Population and Household Impact Projections by Community for Grand County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Thompson Census County Division (CCD)					
Thompson CCD Total					
Population	123	2,259	14,874	7,258	7,643
Households	45	816	4,845	2,160	2,215

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

scenario-defined tar sands projects is projected to reach 929 and 619, in Helper and the unincorporated areas, respectively, in 2005. No population change is forecast to occur in Scofield. Throughout the county, the change in households would closely reflect the change in population.

Duchesne County

Duchesne County would experience the smallest change from the baseline population and new households of any county in the region, due to the high commercial development scenario. There would be no change in population in the county in 1985. The change in population would increase 14.98% annually between 1990 and 1995, but it would decline thereafter. Similarly, the change in new households would reach 504 in 1995 and drop to 313 in 2005, while the change in school-age population would reach 409 in 1995 and drop to 360 in 2005. The change in retirement-age population would total only 22 by 2005.

Most of the projected population and household change in the county would take place in the Roosevelt CCD. In 2005, the population of the city of Roosevelt would be 876 greater than the baseline, the population of the unincorporated areas would be 324 greater than the baseline, and the population of Myton would be 26 greater than the baseline. The change in the

Table 4.10 Population and Household Impact Projections by Community for Uintah County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Uintah-Ouray Census County Division (CCD)					
Uintah-Ouray CCD Total					
Population	0	497	841	661	660
Households	0	171	264	179	184
Ballard					
Population	0	199	336	264	264
Households	0	68	106	72	74
Unincorporated Areas					
Population	0	298	505	397	396
Households	0	103	158	107	110
Vernal Census County Division (CCD)					
Vernal CCD Total					
Population	0	1,068	2,221	1,379	1,373
Households	0	367	698	374	382
Vernal					
Population	0	534	1,111	690	687
Households	0	184	349	187	191
Unincorporated Areas					
Population	0	534	1,111	690	687
Households	0	184	349	187	191

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.11 Population and Household Impact Projections by Community for Wayne County - High Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Hanksville Census County Division (CCD)					
Hanksville CCD Total					
Population	0	159	5,514	2,780	3,093
Households	0	57	1,796	827	897

[a]Only those census county divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.4).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

population of the Duchesne CCD would grow at a slightly faster rate, increasing from 129 in 1990 to 248 in 2005. All of this change would occur in the city of Duchesne; no change would occur in the unincorporated areas of the CCD. The change in the number of households would increase from zero in both CCDs to 244 in the Roosevelt CCD and 69 in the Duchesne CCD in 2005.

Emery County

The change in population (over the baseline) in Emery County would rise sharply between 1985 and 1995, but it would decline almost as sharply between 1995 and 2000. By 2005, Emery County would have 4,319 more people than in the baseline population projections. Similar fluctuations would occur in new households, school-age population, and retirement-age population. The change in school-age population would increase more rapidly than the number of households, such that while the change in the number of households would be 1,005 greater than the change in school-age population in 1995, the difference in 2005 would be eight (see Table 4.4).

The largest change in population and households within Emery County would occur in the Castle Dale-Huntington CCD. The change in population in the CCD would grow from 8 in 1985 to 3,658 in 1995, and then drop to 2,287 in

2005. Castle Dale, Huntington, and Orangeville would have 800, 572, and 572, more people in 2005, respectively, than in the baseline projections. The change in population in the Green River CCD would fluctuate from 4 in 1985 to 5,935 in 1995 to 1,771 in 2005. Most of this change would occur in Green River, although the unincorporated areas would be affected as well. Similarly, the change in the population of the Emery-Ferron CCD would grow from zero in 1985 to 1,220 in 1990, and then decrease to 260 in 2005. Most of the change would occur in Ferron, somewhat less change would occur in Emery, and no change would occur in Clawson or the unincorporated areas of the CCD.

Garfield County

The projected change in the population of Garfield County due to the high scenario tar sands projects would increase from zero in 1985 to 1,466 in 2005. Most of this growth would occur by 1995, with annual increases of less than 3% thereafter. The change in new households would be slower than the change in population, but the change in school-age population would be more rapid than the change in total population. Retirement-age population would increase from equal to the baseline projection in 1985 to 50 more than the baseline projection in 2005.

All of the projected changes in population and households above the baseline levels in Garfield County are expected to occur in the Escalante CCD. About 90% of the change would be in Escalante, 10% would be in Boulder, and there would be no change in the unincorporated areas of the CCD.

Grand County

Through 1995, the change in Grand County population due to the tar sands projects of the high commercial scenario would be about the greatest in the region. This is illustrated in Table 4.4. After reaching a peak of 15,383 more people than the baseline projection in 1995, the change in population would drop 13.25% annually between 1995 and 2000. The change in new households would closely reflect the change in population, while the change in the school-age population would remain at a somewhat higher rate than the change in total population. The change in the number of households would first rise from 45 in 1985 to 5,011 in 1995 and then fall to 2,318 in 2005. A retirement-age population would increase from zero in 1985 to 285 in 1995, declining slightly to 270 in 2005.

All of the population and household changes in Grand County are expected to occur in the Thompson CCD. Table 4.9 identifies the changes over the baseline projects by year. It is presumed that since there are no incorporated areas within the Thompson CCD, a new population center would evolve. The exact location in the CCD is not known.

Uintah County

Table 4.4 indicates that the change in scenario-generated population within Uintah County would increase from zero in 1985 to 3,062 in 1995, but would then decrease to 2,033 in 2005. The change in the number of households over the baseline would be about 550 in 1990, 2000, and 2005. In 1985, there would be no change in the number of households, while in 1995, the change would be 963. The change in school-age population would increase more rapidly than the change in total population throughout the 20 year period. There would be no difference between the baseline projection and the high development scenario projection of retirement-age population in 1985, but the change in retirement-age population would total 39 in 2005.

The largest change in population from the high commercial development scenario would occur in the Vernal CCD (see Table 4.10). The change in population in the CCD would increase from 1,068 in 1990 to 1,373 in 2005, and the change in households would increase from 367 in 1990 to 382 in 2005. This growth would be divided equally between Vernal and the unincorporated areas of the CCD. In the Uintah Ouray CCD, the change in population would increase from 497 in 1990 to 660 in 2005. Somewhat more of this growth would be in the unincorporated areas of the CCD than in Ballard.

Wayne County

The change in population in Wayne County is projected to increase from zero in 1985 to 5,514 in 1995, at which point it would decline to 3,093 in 2005. Table 4.4 indicates that, between 1990 and 1995, the change in population would grow 103.24% annually. Although there would be slight differences, the changes in households, school-age population, and retirement-age population would closely reflect the change in total population. In 2005, the school-age population and the retirement-age population would account for 996 of the total 3,093 increase from the baseline projection.

All of the changes in Wayne County are expected to occur in the Hanksville CCD. The city of Hanksville is the only population center, although unincorporated, within the CCD. Table 4.11 identifies the population and household projections for the Hanksville CCD. This population and household growth could be absorbed by the city of Hanksville or induce the development of another population center within the CCD. If the city of Hanksville would incur this level of growth, its existing social, economic and community structure would likely be altered significantly.

4.1.2.2 Economic Base and Employment Impacts

This section describes the potential changes to the economic base of the seven counties likely to be affected by the development of the tar sands projects, proposed in the high commercial development scenario. Employment

growth by sector and county is assessed together with the projections of total personal income and per capita income. As stated previously, the employment effects of the high commercial tar sands development scenario are presented herein as a change from the baseline conditions.

Total Employment Impacts by County

All seven counties are forecast to realize some increase in total employment over the projected baseline employment levels; particular counties are forecast to realize a continuous increase in employment throughout the study period, while five counties are projected to grow through 1995 before declining.

Carbon and Grand counties would experience particularly rapid employment growth in the 1985-1995 time frame; their annual growth rate would be 68.71% and 61.04%, respectively. Besides a large percentage growth, the actual level of employment in these two counties from the development of the high scenario projects is also large. This is evidenced by the fact that employment in Carbon County is projected to be 7,848 above the baseline in 1995, while in Grand County employment would be 8,092 above the baseline. Only Carbon County is expected to realize employment growth through the year 2005, with 11,550 more workers than that projected under the baseline conditions. Garfield County is the only other county expected to realize employment growth throughout the period; 611 workers above the baseline are projected in 2005.

Five counties are forecast to have no additional employment due to the high scenario tar sands projects in 1985, but expand substantially between 1985 and 1995. Duchesne County is expected to have 350 additional workers in 1995, Emery County 3,209, Garfield County 557, Uintah County 1,823, and Wayne County 4,207. Each of these counties but Garfield County, however, are projected to realize a decrease in employment levels between 1995 and 2005. This is shown in Table 4.12.

Figure 4.2 graphically illustrates these county employment trends. This figure illustrates that Carbon County is expected to absorb the greatest amount of employment growth. The largest tar sand development included in the high scenario projects -- Sunnyside STSA -- is located within Carbon County, thereby precipitating this employment growth. Employment in the region as a whole would rise from 111 above the baseline in 1985 to a level of 19,237 greater in 2005. This represents a 72.63% annual growth rate in the 1985-1995 period followed by a negative 3.00% rate of change in the 1995-2005 time frame. Carbon County would compose around 60% of the regional employment growth in 2005.

Table 4.12 Summary of Total Employment Growth by County Resulting from the High Commercial Development Scenario[a]

County	Change in Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County	42	6,184	7,848	8,633	11,550	68.71	3.94
Duchesne County	0	191	350	283	283	-[b]	-2.10
Emery County	0	376	3,209	876	963	-[b]	-11.33
Garfield County	0	144	557	593	611	-[b]	0.93
Grand County	69	1,273	8,092	3,228	3,334	61.04	-8.49
Uintah County	0	1,034	1,823	1,008	1,007	-[b]	-5.76
Wayne County	0	124	4,207	1,560	1,489	-[b]	-9.87
Total	111	9,326	26,086	16,181	19,237	72.63	-3.00

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Employment Impacts by Industrial Sector

A description of the employment impacts by industrial sector is presented in Tables 4.13 through 4.19. A discussion of each county impact is presented below.

Carbon County

Carbon County would have the most rapid growth in additional employment within the region. The change in Carbon County employment would increase 68.71% annually from 1985 to 1995 and 3.94% annually from 1995 to 2005. Carbon County is one of two counties that would realize increases in the change from baseline employment between 1995 and 2000. The change in employment in the county would total 11,550 in 2005, more than three times the change of any other county in the region.

While the greatest absolute employment change would occur in the contract construction sector in 1985 and 1990, the greatest employment change in 1995, 2000, and 2005 would occur in mining (see Table 4.13). Forty-five percent of the change from baseline employment in 2005 would be in the mining

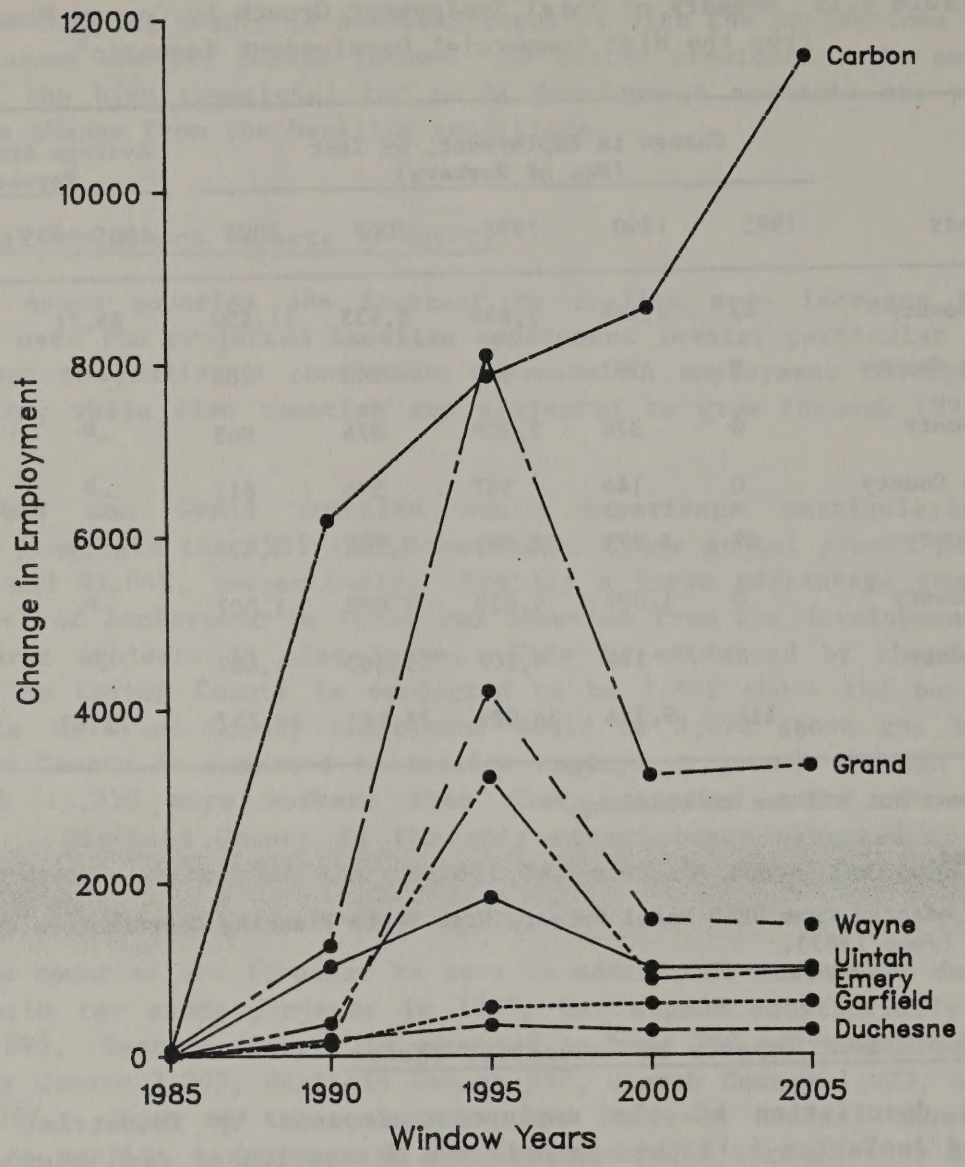

Fig. 4.2 Change in County Employment Levels Due to the High Commercial Development Scenario

sector, with government, contract construction, and wholesale and retail trade accounting for another 36%. There would be no change in agriculture. Employment in all sectors, except mining and agriculture, would change at about the same percentage rate between 1995 and 2005.

Duchesne County

After 1990, the change from baseline employment in Duchesne County would be the lowest in the region. The change in employment would increase from zero in 1985 to 350 in 1995, but would then decrease to 283 in 2000 and

Table 4.13 Changes in Carbon County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	1,470	2,593	3,719	5,153	-[b]	7.11
Contract Construction	28	2,671	1,927	1,246	1,321	52.68	-3.71
Manufacturing	0	39	63	66	90	-[b]	3.63
Transportation, Communication, and Utilities	1	89	141	158	216	64.03	4.36
Wholesale and Retail Trade	4	531	817	911	1,254	70.22	4.38
Finance, Insurance, and Real Estate	1	82	137	149	204	63.56	4.06
Services	2	359	617	671	921	77.39	4.09
Government	5	583	1,018	1,095	1,537	70.17	4.21
Nonfarm Proprietors	2	358	535	619	854	74.88	4.79
Total	42	6,184	7,848	8,633	11,550	68.71	3.94

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

2005. Table 4.14 shows that this change would be distributed among several sectors. Contract construction would have the greatest change in 1990, while government would have the greatest change in 1995, 2000, and 2005. The change in mining employment would remain constant between 1995 and 2005, but the change in all other sectors (except agriculture) would decrease during the same period. There would be no change in employment in agriculture throughout the 20 year period.

Emery County

In Emery County, the change in employment would both increase rapidly and decrease rapidly during the 20 year period. The change in employment would first jump from zero in 1985 to 3,209 in 1995 as illustrated in Table 4.15. It would decrease to 963 in 2005 (11.34% annually between 1995 and 2005). In 1990 and 1995, the greatest change would be in contract

Table 4.14 Changes in Duchesne County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	0	65	65	65	-[b]	0.00
Contract Construction	0	58	16	12	12	-[b]	-2.84
Manufacturing	0	4	7	5	5	-[b]	-3.31
Transportation, Communication, and Utilities	0	6	12	9	9	-[b]	-2.84
Wholesale and Retail Trade	0	43	83	62	61	-[b]	-3.03
Finance, Insurance, and Real Estate	0	6	11	8	8	-[b]	-3.13
Services	0	20	40	30	30	-[b]	-2.84
Government	0	41	90	74	74	-[b]	-1.94
Nonfarm Proprietors	0	13	25	19	19	-[b]	-2.71
Total	0	191	350	283	283	-[b]	-2.10

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

construction, which would account for almost half of the total change in employment in 1995. The greatest change in 2000 and 2005 would be in mining, with the change in government sector employment only slightly less. Between 1995 and 2005, the decrease in the change in employment would range from 0.16% annually in mining to 29.46% annually in contract construction. There would be no change in employment in agriculture between 1985 and 2005.

Garfield County

Table 4.16 identifies that the change in Garfield County employment from the baseline would grow at a decreasing rate between 1985 and 2005. After 1990, the change in employment in Garfield County would be the second lowest in the region, totaling 611 in 2005. One sector would dominate the change in each 10 year period. In 1990, contract construction would account for 72% of the total change in employment. In 1995 through 2005, mining would

Table 4.15 Changes in Emery County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	_[b]	_[b]
Mining	0	21	248	244	244	_[b]	-0.16
Contract Construction	0	88	1,507	41	46	_[b]	-29.46
Manufacturing	0	4	21	8	9	_[b]	-8.12
Transportation, Communication, and Utilities	0	17	74	34	40	_[b]	-5.97
Wholesale and Retail Trade	0	70	388	151	167	_[b]	-8.08
Finance, Insurance, and Real Estate	0	8	45	18	19	_[b]	-8.26
Services	0	34	200	79	87	_[b]	-7.99
Government	0	73	417	174	207	_[b]	-6.76
Nonfarm Proprietors	0	61	309	127	144	_[b]	-7.35
Total	0	376	3,209	876	963	_[b]	-11.34

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

account for about 60% of the total change. There would be no change in employment in the agriculture sector, and the projected change in manufacturing employment would only total four by the year 2005.

Grand County

The change in employment in Grand County would shift considerably between 1985 and 2005. Between 1985 and 1995, the change in employment would jump from 69 to 8,092. In most employment sectors the annual growth rate would be around 60% during this 10 year period. In both 1985 and 1995 the change in employment would be the largest in the region. After 1995, however, the change in employment in the county would decrease 8.49% annually (see Table 4.17).

First contract construction and then mining would comprise about 60% of the change in employment in the county. The change in employment would be

Table 4.16 Changes in Garfield County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	0	360	360	361	-[b]	0.03
Contract Construction	0	103	13	15	16	-[b]	2.10
Manufacturing	0	1	4	4	4	-[b]	0.00
Transportation, Communication, and Utilities	0	2	9	11	11	-[b]	0.20
Wholesale and Retail Trade	0	12	51	59	62	-[b]	1.97
Finance, Insurance, and Real Estate	0	2	8	9	10	-[b]	2.26
Services	0	6	29	34	36	-[b]	2.19
Government	0	10	47	59	66	-[b]	3.45
Nonfarm Proprietors	0	8	37	42	44	-[b]	1.75
Total	0	144	557	593	611	-[b]	0.93

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

greatest for contract construction in 1985, 1990, and 1995 and for mining in 2000 and 2005. Mining is the only sector that would realize increases in the change from baseline employment between 1995 and 2005. Contract construction would experience a 33.27% decline. There would be no change in agricultural employment.

Uintah County

In Uintah County, the change in employment would be slightly more than 1,000 in 1990, 2000, and 2005. Table 4.18 indicates that the highest and lowest changes would occur in 1995 and 1985, respectively, totaling zero in 1985 and 1,823 in 1995. Contract construction and mining would experience the greatest change in 1990 and 1995. Mining would account for 65% of the total change in employment in the county in 2000 and 2005. All sectors but mining are projected to realize a decrease in employment demands from the scenario between 1995 and 2005.

Table 4.17 Changes in Grand County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	101	876	1,903	1,903	-[b]	8.07
Contract Construction	51	831	4,852	80	85	57.70	-33.27
Manufacturing	0	6	40	20	21	-[b]	-6.24
Transportation, Communication, and Utilities	1	15	99	51	55	58.33	-5.71
Wholesale and Retail Trade	5	100	643	330	351	62.53	-5.87
Finance, Insurance, and Real Estate	1	13	88	46	49	56.48	-5.69
Services	3	55	363	190	202	61.54	-5.69
Government	5	100	674	372	419	63.29	-4.64
Nonfarm Proprietors	4	70	457	236	250	60.61	-5.85
Total	69	1,291	8,092	3,228	3,334	61.04	-8.49

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Wayne County

The change in Wayne County employment is projected to grow from zero in 1985 to 4,207 in 1995, after which it is expected to drop to 1,489 in 2005 (see Table 4.19). In 1990 and 1995, about three-fourths of the change in employment would be in the contract construction sector. Mining would have the largest part of the change in employment baseline in 2000 and 2005. Wholesale and retail trade and government employment would be at least 100 workers more than baseline in 1995, 2000, and 2005.

Personal Income Impact Projections

The total personal income projections by county are presented in Table 4.20. These projections are based upon a forecast of per capita income and population growth. Per capita income for the years 1985-2005 was derived by aggregating the average monthly wage levels by industrial sector and assuming

Table 4.18 Changes in Uintah County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	400	641	660	660	-[b]	0.30
Contract Construction	0	416	731	22	22	-[b]	-29.55
Manufacturing	0	3	6	4	4	-[b]	-3.97
Transportation, Communication, and Utilities	0	11	21	15	15	-[b]	-3.31
Wholesale and Retail Trade	0	55	110	74	74	-[b]	-3.89
Finance, Insurance, and Real Estate	0	7	15	10	10	-[b]	-3.97
Services	0	46	94	67	67	-[b]	-3.33
Government	0	76	165	128	128	-[b]	-2.51
Nonfarm Proprietors	0	20	40	27	27	-[b]	-3.85
Total	0	1,034	1,823	1,008	1,007	-[b]	-5.76

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

that (1) the personal income component would remain at the same proportion as the national level and (2) the average annual rate of growth would remain constant. See Appendix A for a detailed description of the methodology.

The per capita income levels for the region are shown in the first line of Table 4.20. Per capita income is projected to increase from $14,424 in 1985 to $15,972 in 1995 but then decrease to $15,012 in 2005. The annual rate of increase in the first 10 years would be 1.02%, with a -0.62% decline in the final 10 years.

The change in total personal income in Carbon County would increase from $1.1 million in 1985 to $385.04 million in 2005. This change would grow at a rate of 71.88% annually from 1985 to 1995 and 4.51% annually from 1995 to 2005. From 1990 through 2005 the change in personal income in the county would be the greatest in the region.

Table 4.19 Changes in Wayne County Employment Resulting from the High Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	0	351	701	960	-[b]	10.59
Contract Construction	0	101	3,055	429	33	-[b]	-36.42
Manufacturing	0	0	16	8	9	-[b]	-5.59
Transportation, Communication, and Utilities	0	1	40	21	24	-[b]	-4.98
Wholesale and Retail Trade	0	6	222	116	131	-[b]	-5.14
Finance, Insurance, and Real Estate	0	1	35	19	21	-[b]	-4.98
Services	0	3	124	67	76	-[b]	-4.78
Government	0	6	206	116	140	-[b]	-3.79
Nonfarm Proprietors	0	5	158	83	94	-[b]	-5.06
Total	0	124	4,207	1,560	1,489	-[b]	-9.87

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

In Duchesne County the change in total personal income would fluctuate from zero in 1985 to $25.62 million in 1995 to $16.87 million in 2005. In 2000 and 2005 this change would be the lowest in the region. The decrease in the percentage change in total personal income (attributable to the high commercial scenario) between 1995 and 2005 would be slightly greater than the decline in population.

The change in total personal income in Emery County would increase from $0.17 million in 1985 to $64.84 million in 2005. It would reach a peak of $172.71 million in 1995 but would decline 9.33% annually from 1995 to 2005.

Garfield County has one of the lowest projections of total personal income. The change in total personal income would increase from zero in 1985 to $22.01 million in 2005. Garfield County is one of only two counties where change in the total personal income would grow between 1995 and 2005.

Table 4.20 Total Personal Income and Per Capita Income Projections by County - High Commercial Development Scenario

County Population and Income Category	Income and Population, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Per Capita Income	14,424	15,456	15,972	14,340	15,012	1.02	-0.62
Change from Baseline, Carbon County							
Population	76	11,217	15,503	18,563	25,649	70.20	5.16
Total Personal Income (1980 $ x 10^6)	1.10	173.37	247.61	266.19	385.04	71.88	4.51
Change from Baseline, Duchesne County							
Population	0	798	1,604	1,127	1,124	-[a]	-3.49
Total Personal Income (1980 $ x 10^6)	0	12.33	25.62	16.16	16.87	-[a]	-4.09
Change from Baseline, Emery County							
Population	12	1,891	10,813	3,913	4,319	97.46	-8.77
Total Personal Income (1980 $ x 10^6)	0.17	29.23	172.71	56.11	64.84	99.84	-9.33
Change from Baseline, Garfield County							
Population	0	292	1,212	1,390	1,466	-[a]	1.92
Total Personal Income (1980 $ x 10^6)	0	4.51	19.36	19.93	22.01	-[a]	1.29
Change from Baseline, Grand County							
Population	125	2,345	15,383	7,556	7,997	61.81	-6.33
Total Personal Income (1980 $ x 10^6)	1.80	36.24	245.70	108.35	120.05	63.50	-6.91
Change from Baseline, Uintah County							
Population	0	1,565	3,062	2,040	2,033	-[a]	-4.01
Total Personal Income (1980 $ x 10^6)	0	24.19	48.91	29.25	30.52	-[a]	-4.61
Change from Baseline, Wayne County							
Population	0	159	5,514	2,780	3,093	-[a]	-5.62
Total Personal Income (1980 $ x 10^6)	0	2.46	88.07	39.87	46.43	-[a]	-6.20

[a]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

In 1985, the change in personal income of $1.80 million in Grand County would be the largest in the region. In 1990 through 2005, the change would be the second largest in the region. The change in personal income would peak at $245.70 million in 1995 and decline to $120.05 million in 2005.

Total personal income in Uintah County would increase from equal to the baseline in 1985 to $48.91 million above the baseline in 1995. Between 1995 and 2005, the change in total personal income would decrease 4.61% annually. This decline would be slightly more rapid than the decrease in population in the county.

In Wayne County, total personal income would shift from equal to the baseline in 1985 to $88.07 million above the baseline in 1995 to $46.43 million above the baseline in 2005. The growth in the change in personal income between 1990 and 1995 would be the greatest in the region. In the period from 1995 to 2005, the change in employment would decline 6.20% annually — somewhat more rapidly than the decline in population.

4.1.2.3 Public and Private Infrastructure Effects

The projected effects on the public and private infrastructure in the region are described in this section. The rate of change in infrastructure demands is addressed first, and a discussion of the magnitude of the impacts follows. Housing, education, health care, public safety, and utility services are included in the analysis.

Rate of Change in Infrastructure Demands

Table 4.21 identifies the growth in the projected change in infrastructure demands between 1985 and 2005, due to the realization of the high commercial development scenario. The change is expressed as a cumulative growth factor rather than percent change because, in many instances, the demand in 2005 would be many times greater (sometimes several thousand percent) than the demand in 1985. The projected change in demand for housing is presented in more detail in Appendix C - Table C.1, which includes CCD and community data.

Carbon County is projected to have the greatest increase in the demand for housing in the region. Between 1985 and 2005, housing demand would grow by factors of 262 for single-family units, 223 for multifamily units, and 266 for mobile homes. The most rapid increase in the county would occur in the Price CCD, where the change in demand would be as much as 264 times greater for single-family units in 2005 than in 1985. The city of Price would have the largest increase, but the change in housing demand in Wellington and the unincorporated areas would grow only slightly less rapidly. The change in housing demand between 1985 and 2005 in the East Carbon and Helper CCDs would increase by factors ranging from 68 (for multifamily units in the Helper CCD)

Table 4.21 Infrastructure Service Demand Growth Factors Precipitated by the Tar Sands Projects of the High Commercial Development Scenario

Infrastructure Category	Cumulative Growth Factors, 1985-2005[a,b]		
	Carbon County	Emery County	Grand County
Housing Units			
Single family	262	251	52
Multifamily	223	188	50
Mobile homes	266	313	48
Education			
Students	492	622	96
Classrooms	296	50	93
Teachers	296	50	93
Health Care			
Hospital beds			
General care	52	9	16
Long-term care	-[b]	-[b]	-[b]
Medical personnel			
Doctors	16	3	5
Dentists	13	3	4
Nurses	44	8	14
Public health nurses	6	1	2
Mental health care			
Clinical psychologists	2	1	1
Mental health workers	3	1	1
Public Safety			
Law enforcement			
Police officers	52	9	16
Patrol cars	52	9	16
Jail floor space	338	360	63
Juvenile holding cells	4	1	2
Fire Protection			
Water flow			
Emergency Medical Service			
Ambulances	6	1	2
Emergency medical technicians	6	1	2
Utility Service Demands			
Water system			
Connections	331	349	63
Supply capacity	322	407	63
Storage capacity	345	407	63
Treatment capacity	322	407	63

Table 4.21 (Cont'd)

Infrastructure Category	Cumulative Growth Factors, 1985-2005[a,b]		
	Carbon County	Emery County	Grand County
Utility Service Demands (Cont'd)			
Sewage system (10^6 gal)	312	158	63
Solid waste			
Other Services			
Parks (land area)	154	26	48
Libraries			
Books	337	360	64
Floor space	338	360	63

[a]Computed as the ratio between 1985 and 2005.

[b]Growth factors for Duchesne, Garfield, Uintah, and Wayne counties were undefined.

to 268 (for mobile homes in the East Carbon CCD). In the city of East Carbon, the change in demand for single unit housing would be 317 times greater in 2005 than in 1985.

The change in housing demand in Duchesne County would not vary much between 1985 and 2005. Most of the change would be concentrated in the Roosevelt CCD, especially in the city of Roosevelt and the unincorporated areas of the CCD. The demand for single-unit housing would increase from 27 units above the baseline in 1980 to 44 above baseline in 1995, but there would be little change thereafter. All of the change in the Duchesne CCD would occur in the city of Duchesne CCD; housing demand would remain at baseline levels in the unincorporated areas.

In Emery County, the change in housing demands would increase by factors of 251 for single-family units, 188 for multifamily units, and 313 for mobile homes between 1985 and 2005. The Castle Dale-Huntington CCD and the Green River CCD would absorb most of the increase. Single-unit housing demand in Green River would jump from one more than baseline in 1985 to 1,000 more than baseline in 1995 to 265 more than baseline in 2005. The change in the Castle Dale-Huntington CCD would center in Castle Dale, Huntington, and Orangeville. The demand for housing in the Emery-Ferron CCD would be less than 50 for each type of unit, with Ferron accounting for most of this change.

The change in the demand for single-unit housing in Garfield County would grow from 65 in 1990 to 255 in 2005. Almost all of this change would occur in the Escalante CCD. Escalante would account for about 90% of the increase in housing demand in the county, Boulder would account for about 10%, and there would be no change in the unincorporated areas.

In Grand County, the change in housing demand would be about 50 times greater in 2005 than in 1985. Housing demand in the Thompson CCD, where almost all of the growth would occur, would increase for single-family units from 27 above baseline in 1985 to 1,320 above baseline in 2005, down from a peak of 2,907 above the baseline in 1995. Multifamily unit and mobile home demand would increase at slightly slower rates.

Over two-thirds of the change in housing demand in Uintah County would take place in the Vernal CCD. The change in demand in the Vernal CCD would be divided equally between Vernal and the unincorporated areas. In Vernal, the change in demand for multifamily units would fluctuate from 28 above the baseline in 1985 to 53 in 1995 to 29 in 2005. Similar shifts would occur in the other communities in the county. The unincorporated areas would account for about 60% of the change in housing demand in the Uintah Ouray CCD, while Ballard would account for 40%.

Between 1990 and 2005, the change in housing demand in Wayne County would increase by a factor of 15. The change in demand for single unit housing would increase from zero in 1985 to 1,078 in 1995 before leveling off at 539 in 2005. All of the housing demand caused by the high commercial scenario developments in Wayne County would occur in the Hanksville CCD.

Education is projected to increase the most rapidly of any infrastructure category due to the high commercial scenario developments. The change in the number of students between 1985 and 2005 would increase by as much as a factor of 622 in Emery County, while the change in the number of classrooms and teachers would increase by as much as a factor of 296 in Carbon County.

The demand for health care services would increase at a slower rate. Carbon and Grand counties would have the most rapid growth in the demand for health services, while there would be only slight increases in such demand in Duchesne and Garfield counties. The change in the demand for general care hospital beds and nurses would be greatest, since they are projected to increase by factors of 52 and 44, respectively, in Carbon County. The demand for mental health care workers and clinical psychologists would remain at baseline levels or grow by one or two in each county.

The change in the demand for public safety services would vary depending on the type of service. Between 1990 and 1995, the need for police officers and police cars, in addition to the baseline requirements, would more than double in every county except Duchesne and Uintah, but the change in the demand for jail space would grow even more rapidly. The change in the need

for jail space would be 360 times greater in Emery County and 338 times greater in Carbon County. Conversely, only in Carbon County would the change in the demand for emergency medical services grow by more than 200% between 1985 and 2005.

The growth in the demand for utility services due to the high commercial development scenario would be comparable to the growth in educational services. The change in the demand for water system services between 1985 and 2005 would increase by factors ranging from 312 to 407 in Carbon and Emery counties. Moreover, between 1990 and 2005, the change in the demand for sewage system services would more than double in every county except Duchesne and Uintah counties.

Similarly, the change in the demand for parks between 1985 and 2005 would double in every county except Duchesne and Uintah counties. In the same period, the change in library services would be as much as 360 times greater in Emery County and 338 times greater in Carbon County.

Magnitude of Impact Caused by High Commercial Scenario Development Infrastructure Demands

Summaries of the changes in infrastructure service demands resulting from the high commercial development scenario are presented by county in Tables 4.22 through 4.28. In Carbon County, the high commercial scenario would account for over 60% of the total demand for all services but long-term care hospital beds in 2005. The high commercial scenario would account for only about 1% of the housing, education, and utility service demands in 1985; the scenario impacts would account for up to 50% of health care and public safety service demands in the same year. For most categories, the demands created by the high commercial development scenario would increase from about 48% of the total demand in 1990 to roughly 55% of the total demand in 2000.

In Duchesne County, there would be no additional infrastructure service demands produced by the high commercial development scenario in 1985. After 1985, the high commercial scenario would account for a varying proportion of the total demand, depending on the type of service and the year. The housing demand caused by the high scenario impact would fluctuate from 13% of the total in 1990 to 22% of the total in 1995, and back to 14% of the total in 2005. Similar shifts would occur in the other infrastructure categories, reflecting the rise and fall in the change in population over time. The education services required as a result of the scenario would rise from 8% of the total in 1990 to 18% of the total in 2005. Most health care and public safety services required by the scenario would remain at a constant percentage of the total. Utility, park, and library services demanded by the high commercial scenario population would increase from 12% of the total in 1990 to 17% of the total in 2005.

Table 4.22 Summary of the Changes in Carbon County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,290	17	1.3	2,126	2,430	53.3	2,396	3,030	55.8	2,528	3,315	56.7	2,636	4,461	62.9
Multifamily	323	5	1.5	532	608	53.3	599	758	55.8	632	829	56.7	659	1,116	62.9
Mobile homes	538	7	1.3	886	1,013	53.3	998	1,263	55.9	1,053	1,382	56.8	1,098	1,859	62.9
Education															
Students	1,924	15	0.8	3,824	2,305	37.6	4,824	3,609	42.8	4,624	4,861	51.2	4,724	7,385	61.0
Classrooms	77	1	1.3	153	93	37.8	193	145	42.9	185	195	51.3	189	296	61.0
Teachers	77	1	1.3	153	93	37.8	193	145	42.9	185	195	51.3	189	296	61.0
Health Care															
Hospital beds															
General care	15	1	6.3	25	23	47.9	29	32	52.5	30	38	55.9	31	52	62.7
Long-term care	23	0	0	39	9	18.8	39	12	23.5	39	27	40.9	43	35	44.9
Medical personnel															
Doctors	5	1	16.7	8	7	46.7	9	10	52.6	9	12	57.1	10	16	61.5
Dentists	4	1	20.0	7	6	46.2	8	8	50.0	8	10	55.6	8	13	61.9
Nurses	13	1	7.1	21	20	48.8	25	27	51.9	25	32	56.1	26	44	62.9
Public health nurses	2	1	33.3	3	3	50.0	3	4	57.1	3	4	57.1	4	6	60.0
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	2	66.7
Mental health workers	1	1	50.0	2	2	50.0	2	2	50.0	2	2	50.0	2	3	60.0
Public Safety															
Law enforcement															
Police officers	15	1	6.3	25	23	47.9	29	32	52.5	30	38	55.9	31	52	62.7
Patrol cars	15	1	6.3	25	23	47.9	29	32	52.5	30	38	55.9	31	52	62.7
Jail space (sq ft)	3,703	38	1.0	6,161	5,609	47.7	7,161	7,752	52.0	7,306	9,282	56.0	7,551	12,825	62.9
Juvenile holding cells	1	1	50.0	2	2	50.0	2	3	60.0	2	3	60.0	2	4	66.7
Fire Protection															
Water flow (gpm)/ duration (hr)	3,000/ 10	1,000/ 4	25.0	3,000/ 10	3,000/ 10	50.0	3,000/ 10	4,000/ 10	57.1	3,000/ 10	4,000/ 10	57.1	3,000/ 10	5,000/ 10	62.5
Emergency Medical Service															
Ambulances	2	1	33.3	3	3	50.0	3	4	57.1	3	4	57.1	4	6	60.0
Emergency medical technicians	14	7	33.3	21	21	50.0	21	28	57.1	21	28	57.1	28	42	60.0
Utility Service Demands															
Water system															
Connections	2,390	25	1.0	3,975	3,619	47.7	4,620	5,002	52.0	4,714	5,989	56.0	4,872	8,275	62.9
Supply (10^6 gal/d)	3.8	0.1	2.6	6.4	5.8	47.5	7.4	8.0	51.9	7.5	9.6	56.1	7.8	13.2	62.9
Storage (10^6 gal/d)	1.9	0.1	5.0	3.2	2.9	47.5	3.7	4.0	51.9	3.8	4.8	55.8	3.9	6.6	62.9
Treatment (10^6 gal/d)	3.8	0.1	2.6	6.4	5.8	47.5	7.4	8.0	51.9	7.5	9.6	56.1	7.8	13.2	62.9
Sewage system (10^6 gal/d)	0.7	0.1	12.5	1.2	1.1	47.8	1.4	1.6	53.3	1.5	1.9	55.9	1.5	2.6	63.4
Other Services															
Parks (acres)	45	1	2.2	74	68	47.9	86	94	52.2	88	112	56.0	91	154	62.9
Libraries															
Books	14,812	152	1.0	24,642	22,434	47.7	28,642	31,006	52.0	29,222	37,126	56.0	30,202	51,298	62.9
Space (sq ft)	3,703	38	1.0	6,161	5,609	47.7	7,161	7,752	52.0	7,306	9,282	56.0	7,551	12,825	62.9

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.23 Summary of the Changes in Duchesne County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing															
Single family units	1,007	0	0	1,072	165	13.3	1,055	303	22.3	1,088	183	14.4	1,139	188	14.2
Multifamily	252	0	0	268	42	13.5	264	76	22.4	273	46	14.4	285	47	14.2
Mobile homes	420	0	0	447	69	13.4	439	126	22.3	454	77	14.5	475	79	14.3
Education															
Students	1,254	0	0	1,924	160	7.7	2,244	409	15.4	1,824	357	16.4	1,724	360	17.3
Classrooms	51	0	0	77	7	8.3	90	17	15.9	73	15	17.0	69	15	17.9
Teachers	51	0	0	77	7	8.3	90	17	15.9	73	15	17.0	69	15	17.9
Health Care															
Hospital beds															
General care	11	0	0	13	2	13.3	13	4	23.5	12	3	20.0	11	3	21.4
Long-term care	6	0	0	9	1	10.0	14	1	6.7	18	1	5.3	24	1	4.0
Medical personnel															
Doctors	4	0	0	4	1	20.0	4	1	20.0	4	1	20.0	4	1	20.0
Dentists	3	0	0	4	1	20.0	4	1	20.0	3	1	25.0	3	1	25.0
Nurses	9	0	0	11	2	15.4	11	3	21.4	10	2	16.7	10	2	16.7
Public health nurses	2	0	0	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Mental health care															
Clinical psychologists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	11	0	0	13	2	13.3	13	4	23.5	12	3	20.0	11	3	21.4
Patrol cars	11	0	0	13	2	13.3	13	4	23.5	12	3	20.0	11	3	21.4
Jail space (sq ft)	2,608	0	0	3,033	399	11.6	3,058	802	20.8	2,863	564	16.5	2,703	562	17.2
Juvenile holding cells	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	2,500/ 10	0/0	0	3,000/ 10	1,000/ 4	25.0	3,000/ 10	1,250/ 5	29.4	2,500/ 10	1,000/ 4	28.6	2,500/ 10	1,000/ 4	28.6
Emergency Medical Service															
Ambulances	2	0	0	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Emergency medical technicians	14	0	0	14	7	33.3	14	7	33.3	14	7	33.3	14	7	33.3
Utility Service Demands															
Water system															
Connections	1,683	0	0	1,957	258	11.6	1,978	518	20.8	1,847	364	16.5	1,744	363	17.2
Supply (10^6 gal/d)	2.7	0	0	3.1	0.4	11.4	3.2	0.8	20.0	3.0	0.6	16.7	2.8	0.6	17.6
Storage (10^6 gal/d)	1.3	0	0	1.6	0.2	11.1	1.6	0.4	20.0	1.5	0.3	16.7	1.4	0.3	17.6
Treatment (10^6 gal/d)	2.7	0	0	3.1	0.4	11.4	3.2	0.8	20.0	3.0	0.6	16.7	2.8	0.6	17.6
Sewage system (10^6 gal/d)	0.5	0	0	0.6	0.1	14.3	0.6	0.2	25.0	0.6	0.1	14.3	0.5	0.1	16.7
Other Services															
Parks (acres)	32	0	0	37	5	11.9	37	10	21.3	35	7	16.7	33	7	17.5
Libraries															
Books	10,430	0	0	12,130	1,596	11.6	12,230	3,208	20.8	11,450	2,254	16.4	10,810	2,248	17.2
Space (sq ft)	2,608	0	0	3,033	399	11.6	3,058	802	20.8	2,863	564	16.5	2,703	562	17.2

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.24 Summary of the Changes in Emery County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	382	3	0.8	448	410	47.8	472	2,114	81.7	448	699	60.9	412	752	64.6
Multifamily	96	1	1.0	112	103	47.9	118	529	81.8	112	175	61.0	103	188	64.6
Mobile homes	159	1	0.6	187	171	47.8	197	881	81.7	187	292	61.0	172	313	64.5
Education															
Students	816	2	0	1,416	389	21.6	1,716	2,517	59.5	1,516	1,025	40.3	1,516	1,244	45.1
Classrooms	33	1	2.9	57	16	21.9	69	101	59.4	61	41	40.2	61	50	45.0
Teachers	33	1	2.9	57	16	21.9	69	101	59.4	61	41	40.2	61	50	45.0
Health Care															
Hospital beds															
General care	6	1	14.3	7	4	36.4	8	22	73.3	7	8	53.3	7	9	56.3
Long-term care	6	0	0	6	2	25.0	6	9	60.0	4	6	60.0	4	6	60.0
Medical personnel															
Doctors	2	1	33.3	3	2	40.0	3	7	70.0	2	3	60.0	2	3	60.0
Dentists	2	1	33.3	2	1	33.3	2	6	75.0	2	2	50.0	2	3	60.0
Nurses	5	1	16.7	6	4	40.0	7	19	73.1	6	7	53.8	6	8	57.1
Public health nurses	1	1	50.0	1	1	50.0	1	3	75.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	1	1	50.0	1	2	66.7	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	6	1	14.3	7	4	36.4	8	22	73.3	7	8	53.3	7	9	56.3
Patrol cars	6	1	14.3	7	4	36.4	8	22	73.3	7	8	53.3	7	9	56.3
Jail space (sq ft)	1,305	6	0.5	1,695	946	35.8	1,815	5,407	74.9	1,640	1,957	54.4	1,550	2,160	58.2
Juvenile holding cells	1	1	50.0	1	1	50.0	1	2	66.7	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	1,750/ 7	1,000/ 4	36.4	2,000/ 8	1,500/ 6	42.9	2,000/ 8	3,000/ 10	60.0	2,000/ 8	2,000/ 8	50.0	2,000/ 8	2,000/ 8	50.0
Emergency Medical Service															
Ambulances	1	1	50.0	1	1	50.0	1	3	75.0	1	1	50.0	1	1	50.0
Emergency medical technicians	7	7	50.0	7	7	50.0	7	21	75.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	842	4	0.5	1,094	611	35.8	1,171	3,489	74.9	1,058	1,263	54.4	1,000	1,394	58.2
Supply (10^6 gal/d)	1.3	0.1	7.1	1.8	1.0	35.7	1.9	5.6	74.7	1.7	2.0	54.1	1.6	2.2	57.9
Storage (10^6 gal/d)	0.7	0.1	12.5	0.9	0.5	35.7	0.9	2.8	75.7	0.8	1.0	55.5	0.8	1.1	57.9
Treatment (10^6 gal/d)	1.3	0.1	7.1	1.8	1.0	35.7	1.9	5.6	74.7	1.7	2.0	54.1	1.6	2.2	57.9
Sewage system (10^6 gal/d)	0.3	0.1	25.0	0.3	0.2	40.0	0.4	1.1	73.3	0.3	0.4	57.1	0.3	0.4	57.1
Other Services															
Parks (acres)	16	1	5.9	21	12	36.4	22	65	74.7	20	24	54.5	19	26	57.8
Libraries															
Books	5,218	24	0.5	6,778	3,782	35.8	7,258	21,626	74.9	6,558	7,826	54.4	6,198	8,638	58.2
Space (sq ft)	1,305	6	0.5	1,695	946	35.8	1,815	5,407	74.9	1,640	1,957	54.4	1,550	2,160	58.2

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.25 Summary of the Changes in Garfield County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	139	0	0	199	63	24.0	241	237	49.6	277	249	47.3	319	255	44.4
Multifamily	35	0	0	50	16	24.2	61	60	49.6	70	63	47.4	80	64	44.4
Mobile homes	58	0	0	83	27	24.5	101	99	49.5	116	104	47.3	133	107	44.6
Education															
Students	128	0	0	328	60	15.5	428	282	39.7	588	364	40.8	628	422	40.2
Classrooms	6	0	0	14	3	17.6	18	12	40.0	22	15	40.5	26	17	39.5
Teachers	6	0	0	14	3	17.6	18	12	40.0	22	15	40.5	26	17	39.5
Health Care															
Hospital beds															
General care	2	0	0	2	1	33.0	3	3	50.0	3	3	50.0	4	3	42.9
Long-term care	3	0	0	3	1	25.0	3	1	25.0	1	2	66.7	2	2	50.0
Medical personnel															
Doctors	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Dentists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Nurses	2	0	0	2	1	33.3	2	3	60.0	3	3	50.0	3	3	50.0
Public health nurses	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	2	0	0	2	1	33.3	3	3	50.0	3	3	50.0	4	3	42.9
Patrol cars	2	0	0	2	1	33.3	3	3	50.0	3	3	50.0	4	3	42.9
Jail space (sq ft)	314	0	0	464	146	23.9	564	606	51.8	664	695	51.1	764	733	49.0
Juvenile holding cells	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	1,000/ 4	0	0	1,000/ 4	1,000/ 4	50.0	1,250/ 5	1,000/ 4	44.4	1,250/ 5	1,250/ 5	50.0	1,500/ 6	1,250/ 5	45.5
Emergency Medical Service															
Ambulances	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Emergency medical technicians	7	0	0	7	7	50.0	7	7	50.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	203	0	0	300	95	24.1	364	391	51.8	429	449	51.1	493	473	49.0
Supply (10^6 gal/d)	0.3	0	0	0.5	0.2	28.6	0.6	0.6	50.0	0.7	0.7	50.0	0.8	0.8	50.0
Storage (10^6 gal/d)	0.2	0	0	0.2	0.1	33.0	0.3	0.3	50.0	0.3	0.4	57.1	0.4	0.4	50.0
Treatment (10^6 gal/d)	0.3	0	0	0.5	0.2	28.6	0.6	0.6	50.0	0.7	0.7	50.0	0.8	0.8	50.0
Sewage system (10^6 gal/d)	0.1	0	0	0.1	0.1	50.0	0.1	0.1	50.0	0.1	0.1	50.0	0.2	0.1	33.3
Other Services															
Parks (acres)	4	0	0	6	2	25.0	7	8	53.3	8	9	52.9	10	9	47.4
Libraries															
Books	1,254	0	0	1,854	584	24.0	2,254	2,424	51.8	2,654	2,780	51.2	3,054	2,932	49.0
Space (sq ft)	314	0	0	464	146	23.9	564	606	51.8	664	695	51.1	764	733	49.0

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.26 Summary of the Changes in Grand County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	-95	27	-[c]	11	509	97.9	47	3,007	98.5	11	1,350	99.2	59	1,391	95.9
Multifamily	-23	7	-[c]	3	128	97.7	12	752	98.4	3	338	99.1	15	348	95.9
Mobile homes	-39	12	-[c]	5	212	97.7	20	1,253	98.4	5	563	99.1	25	580	95.9
Education															
Students	99	24	19.5	479	482	50.2	599	3,581	85.7	479	1,978	80.5	529	2,302	81.3
Classrooms	4	1	20.0	20	20	50.0	24	144	85.7	20	80	80.0	22	93	80.9
Teachers	4	1	20.0	20	20	50.0	24	144	85.7	20	80	80.0	22	93	80.9
Health Care															
Hospital beds															
General care	0	1	100.0	1	5	83.3	1	31	96.9	1	16	94.1	1	16	94.1
Long-term care	2	0	0	2	2	50.0	2	12	85.7	2	11	84.6	2	11	84.6
Medical personnel															
Doctors	0	1	100.0	1	2	66.7	1	10	90.9	1	5	83.3	1	5	83.3
Dentists	0	1	100.0	1	2	66.7	1	8	88.9	1	4	80.0	1	4	80.0
Nurses	0	1	100.0	1	4	80.0	1	27	96.4	1	13	92.9	1	14	93.3
Public health nurses	0	1	100.0	1	1	50.0	1	4	80.0	1	2	66.7	1	2	66.7
Mental health care															
Clinical psychologists	0	1	100.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	0	1	100.0	1	1	50.0	1	2	66.7	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	0	1	100.0	1	5	83.3	1	31	96.9	1	16	94.1	1	16	94.1
Patrol cars	0	1	100.0	1	5	83.3	1	31	96.9	1	16	94.1	1	16	94.1
Jail space (sq ft)	-220	63	-[c]	5	1,173	99.6	110	7,692	98.6	45	3,778	98.8	130	3,999	96.9
Juvenile holding cells	0	1	100.0	1	1	50.0	1	2	66.7	1	1	50.0	1	2	66.7
Fire Protection															
Water flow (gpm)/ duration (hr)	0/0	1,000/ 4	100.0	1,000/ 4	1,500/ 6	60.0	1,000/ 4	4,000/ 10	80.0	1,000/ 4	2,500/ 10	71.4	1,000/ 4	2,500/ 10	71.4
Emergency Medical Service															
Ambulances	0	1	100.0	1	1	50.0	1	4	80.0	1	2	66.7	1	2	66.7
Emergency medical technicians	0	7	100.0	7	7	50.0	7	28	80.0	7	14	66.7	7	14	66.7
Utility Service Demands															
Water system															
Connections	-142	41	-[c]	3	757	99.6	71	4,963	98.6	29	2,438	98.8	84	2,580	96.8
Supply (10^6 gal/d)	-0.2	0.1	-[c]	0.1	1.2	92.3	0.1	7.9	98.8	0.1	3.9	97.5	0.1	4.1	97.6
Storage (10^6 gal/d)	-0.1	0.1	-[c]	0.1	0.6	85.7	0.1	4.0	97.6	0.1	2.0	95.2	0.1	2.1	95.5
Treatment (10^6 gal/d)	-0.2	0.1	-[c]	0.1	1.2	92.3	0.1	7.9	98.8	0.1	3.9	97.5	0.1	4.1	97.6
Sewage system (10^6 gal/d)	-0.1	0.1	-[c]	0.1	0.2	66.7	0.1	1.5	93.8	0.1	0.8	88.9	0.1	0.8	88.9
Other Services															
Parks (acres)	-2	1	-[c]	1	15	93.8	2	93	97.9	1	46	97.9	2	48	96.0
Libraries															
Books	-882	250	-[c]	18	4,690	99.6	438	30,766	98.6	178	15,112	98.8	518	15,994	96.9
Space (sq ft)	-220	63	-[c]	5	1,173	99.6	110	7,692	98.6	45	3,778	98.8	130	3,999	96.9

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

[c]Undefined.

Table 4.27 Summary of the Changes in Uintah County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,014	0	0	1,502	323	17.7	1,560	578	27.0	1,566	332	17.5	1,608	340	17.5
Multifamily	254	0	0	378	81	17.6	390	145	27.1	392	83	17.5	402	85	17.5
Mobile homes	423	0	0	630	135	17.6	650	241	27.0	653	139	17.6	670	142	17.5
Education															
Students	1,400	0	0	3,010	314	9.4	3,770	781	17.2	3,020	646	17.6	2,790	651	18.9
Classrooms	56	0	0	121	13	9.7	151	32	17.5	121	26	17.7	112	27	19.4
Teachers	56	0	0	121	13	9.7	151	32	17.5	121	26	17.7	112	27	19.4
Health Care															
Hospital beds															
General care	11	0	0	18	4	18.2	19	7	26.9	17	5	22.7	16	5	23.8
Long-term care	10	0	0	21	1	4.5	29	1	3.3	35	1	2.8	42	2	4.5
Medical personnel															
Doctors	4	0	0	6	1	14.3	6	2	25.0	6	2	25.0	5	2	28.6
Dentists	3	0	0	5	1	16.7	5	2	28.6	5	2	28.6	4	2	33.3
Nurses	9	0	0	15	3	16.7	16	6	27.3	15	4	21.1	14	4	22.2
Public health nurses	2	0	0	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Mental health care															
Clinical psychologists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	11	0	0	18	4	18.2	19	7	26.9	17	5	22.7	16	5	23.8
Patrol cars	11	0	0	18	4	18.2	19	7	26.9	17	5	22.7	16	5	23.8
Jail space (sq ft)	2,602	0	0	4,402	783	15.1	4,672	1,531	24.7	4,232	1,020	19.4	3,842	1,017	20.9
Juvenile holding cells	1	0	0	2	1	33.3	2	1	33.3	2	1	33.3	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	2,500/ 10	0	0	3,000/ 10	1,250/ 5	29.4	3,000/ 10	1,750/ 7	36.8	3,000/ 10	1,500/ 6	33.3	3,000/ 10	1,500/ 6	33.3
Emergency Medical Service															
Ambulances	2	0	0	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Emergency medical technicians	14	0	0	14	7	33.3	14	7	33.3	14	7	33.3	14	7	33.3
Utility Service Demands															
Water system															
Connections	1,679	0	0	2,841	505	15.1	3,015	988	24.7	2,731	659	19.4	2,479	656	20.9
Supply (10^6 gal/d)	2.7	0	0	4.5	0.8	15.1	4.8	1.6	25.0	4.4	1.1	20.0	4.0	1.0	20.0
Storage (10^6 gal/d)	1.3	0	0	2.3	0.4	14.8	2.4	0.8	25.0	2.2	0.5	18.5	2.0	0.5	20.0
Treatment (10^6 gal/d)	2.7	0	0	4.5	0.8	15.1	4.8	1.6	25.0	4.4	1.1	20.0	4.0	1.0	20.0
Sewage system (10^6 gal/d)	0.5	0	0	0.9	0.2	18.2	0.9	0.3	25.0	0.8	0.2	20.0	0.8	0.2	20.0
Other Services															
Parks (acres)	32	0	0	53	10	15.9	57	19	25.0	51	13	20.3	47	13	21.7
Libraries															
Books	10,408	0	0	17,608	3,130	15.1	18,688	6,124	24.7	16,928	4,080	19.4	15,368	4,066	20.9
Space (sq ft)	2,608	0	0	4,402	783	15.1	4,672	1,531	24.7	4,232	1,020	19.4	3,842	1,017	20.9

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.28 Summary of the Changes in Wayne County Infrastructure Service Demands Resulting from the High Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario		Projected Baseline Demand Increment[b]	High Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	38	0	0	80	35	30.4	122	1,078	89.8	164	497	75.2	194	539	73.4
Multifamily	10	0	0	20	9	31.0	31	270	89.7	41	125	75.3	49	135	73.4
Mobile homes	16	0	0	33	15	31.3	51	449	89.8	68	207	75.3	81	225	73.5
Education															
Students	48	0	0	98	33	25.2	158	1,284	89.0	198	728	78.6	238	891	78.9
Classrooms	2	0	0	4	2	33.3	7	52	88.1	8	30	78.9	10	36	78.3
Teachers	2	0	0	4	2	33.3	7	52	88.1	8	30	78.9	10	36	78.3
Health Care															
Hospital beds															
General care	1	0	0	1	1	50.0	2	12	85.7	2	6	75.0	3	7	70.0
Long-term care	2	0	0	3	1	25.0	4	5	55.6	5	4	44.4	6	5	45.5
Medical personnel															
Doctors	1	0	0	1	1	50.0	1	4	80.0	1	2	66.7	1	2	66.7
Dentists	1	0	0	1	1	50.0	1	3	75.0	1	2	66.7	1	2	66.7
Nurses	1	0	0	1	1	50.0	2	10	83.3	2	5	71.4	2	6	75.0
Public health nurses	1	0	0	1	1	50.0	1	2	66.7	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	1	0	0	1	1	50.0	2	12	85.7	2	6	75.0	3	7	70.0
Patrol cars	1	0	0	1	1	50.0	2	12	85.7	2	6	75.0	3	7	70.0
Jail space (sq ft)	105	0	0	215	80	27.1	330	2,757	89.3	420	1,390	76.8	510	1,547	75.2
Juvenile holding cells	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	1,000/ 4	0/0	0	1,000/ 4	1,000/ 4	50.0	1,000/ 4	2,500/ 10	71.4	1,000/ 4	1,750/ 7	63.6	1,250/ 5	1,750/ 7	58.3
Emergency Medical Service															
Ambulances	1	0	0	1	1	50.0	1	2	66.7	1	1	50.0	1	1	50.0
Emergency medical technicians	7	0	0	7	7	50.0	7	14	66.7	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	68	0	0	139	52	27.2	213	1,779	89.3	271	897	76.8	329	998	75.2
Supply (10^6 gal/d)	0.1	0	0	0.2	0.1	33.3	0.3	2.8	90.3	0.4	1.4	77.8	0.5	1.6	76.2
Storage (10^6 gal/d)	0.1	0	0	0.1	0.1	50.0	0.2	1.4	87.5	0.2	0.7	77.8	0.3	0.8	72.7
Treatment (10^6 gal/d)	0.1	0	0	0.2	0.1	33.3	0.3	2.8	90.3	0.4	1.4	77.8	0.5	1.6	76.2
Sewage system (10^6 gal/d)	0.1	0	0	0.1	0.1	50.0	0.1	0.6	85.7	0.1	0.3	75.0	0.1	0.3	75.0
Other Services															
Parks (acres)	2	0	0	3	1	25.0	4	34	89.5	6	17	73.9	7	19	73.0
Libraries															
Books	418	0	0	858	318	47.5	1,318	11,028	89.3	1,678	5,560	76.8	2,038	6,186	75.2
Space (sq ft)	105	0	0	215	80	27.1	330	2,757	89.3	420	1,390	76.8	510	1,547	75.2

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

The proportion of the housing demand in Emery County attributable to the high commercial scenario would jump from one percent in 1985 to 65% in 2005. Similar, although less dramatic, increases would occur in education services, hospital beds and medical personnel, law enforcement services, utility services, and parks and libraries. The mental health care and emergency medical services demanded under the high scenario would remain at 50% of the total throughout the 20 year period. For each service, the demand caused by the high scenario would be greatest in 1995, ranging from 59% of all education services to 82% of all housing services.

The high commercial development scenario would account for about half of the infrastructure service demands in Garfield County between 1995 and 2005. There would be no service demands caused by the high scenario in 1985. In 1990, the high commercial scenario is projected to require service demands in the county ranging from about 17% of education services to 50% of selected health care and public safety services. Between 1995 and 2005, the high scenario would account for 40% to 52% of the demand for most services in the county. The most striking exception to this trend would be long-term care hospital beds, where the high scenario would result in 25% of the total demand in 1995 and 67% of the total demand in 2000.

In Grand County, the high commercial development scenario would produce markedly larger infrastructure service demands than the baseline projections. With the single exception of education services, all of the service demands in 1985 would be the result of the high scenario. Over 85% of the total utility, housing, park, and library service demands between 1990 and 2005 would be caused by the high scenario. Education service needs created by the high commercial scenario would grow from 50% of the total in 1990 to over 80% of the total thereafter. The high scenario would be responsible for 66% to 97% of the total hospital bed, medical, personnel, and public safety services demand in 2005. The lowest proportion of total service demand caused by the high commercial development scenario in 2005 would be 50% of the mental health care services.

The projected baseline demand would produce most of the need for infrastructure services in Uintah County. The high commercial development scenario would not create any additional service demands in 1985. Throughout the 1990 to 2005 period, the high scenario would account for one-third of the demand for emergency medical services and public health nurses, and between 15% and 50% of the need for dentists, doctors, and juvenile holding cells. Less than 5% of the demand for long-term care hospital beds would be attributable to the high scenario. For housing, education, utilities, and all other services, the high commercial development scenario is expected to produce less than 30% of the total demand in 1990 and less than 20% of the total demand in 2005.

Contrary to the effects in Uintah County, the high commercial development scenario would create most of the total infrastructure service demands in Wayne County. There would not be any service demands produced by the high

scenario in 1985. However, the services required by the high scenario would peak 10 years later, when about 89% of the total need for housing, education, utility, park, library, and most law enforcement services would be the result of the high commercial development scenario. By 2005, between 70% and 80% of the demand for those services would be due to the high scenario. Half of the total mental health care services, emergency medical services, public health nurses, and juvenile holding cells in 1990, 2000, and 2005 would be required as a result of the high commercial development scenario.

4.1.2.4 Indian Reservation Impacts

The impacts on the Uintah and Ouray Indian Reservation have already been included in the county and CCD totals presented in Sec. 4.1.2. Those impacts that are specific to the reservation are identified and discussed in the following section. Only the population and housing impacts on the reservation will be discussed, owing to the fact that the UPED model did not provide employment and personal income data for such a detailed geographic level. A sufficient information base was also unavailable to make public and private infrastructure projections. However, total demands on the counties and CCDs involved do include the impacts which could occur on the Reservation in these categories.

The Ute tribe conducted a survey of the attitudes of its members concerning possible energy development in the Uintah Basin. The surveyors found that the Utes had many of the same concerns as non-Indians regarding possible energy development. They were most concerned that their wilderness areas would be ruined, pollution would increase, and public services would be over-extended. They were, however, excited about the possibility that energy development would increase employment, stimulate the economy, and encourage young people to remain on the reservation.

Table 4.29 indicates that population growth resulting from the high commercial scenario activities is projected to reach a peak of 1,014 above the baseline in 1995. At that time, population caused by the tar sands developments in the area would account for 21% of the total change (Table 4.30). From this time through the end of the period, however, population growth is expected to decline to only 720 people above the baseline projection in 2005; a decrease of about 30%. These 720 additional people would represent about 18% of the population change for that year.

The growth in the number of households is expected to follow the same trends as the growth in population (see Table 4.29). In 1995, there would be 318 additional households, whereas in 2005 there would be only 201 additional households. Again, the growth created by the high scenario would not match the growth projected by the baseline. The highest proportion of household growth attributable to the the high commercial scenario would occur in 1995 when 14.3% of the household growth on the reservation is expected to be induced by the high scenario projects.

Table 4.29 Summary of Regional Socioeconomic Impacts by Category and Window Year for the High Commercial Development Scenario -- Uintah and Ouray Indian Reservation[a]

Socioeconomic Development Category	Change from Baseline, by Year					Percent Change	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Population	0	576	1,014	722	720	-[b]	-[b]	-3.37
Households (No. of units)	0	188	318	195	201	-[b]	-[b]	-4.48

[a]Reservation is defined as the unincorporated portions of the Roosevelt and the Uintah and Ouray Census County Divisions.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

4.2 LOW COMMERCIAL DEVELOPMENT SCENARIO: DESCRIPTION OF IMPACTS

The projected impacts of the low commercial development scenario are described in this section. Two important assumptions underlie these projections. The first assumption is that the baseline projections (described in Sec. 2) would accurately reflect the socioeconomic composition of the counties in the time periods under study. The second assumption is that the manpower requirements of the tar sands projects (described in Sec. 3) would not change. Given these assumptions, the following analysis is based on the difference between the baseline projections and the projections in the low development scenario.

4.2.1 Total Regional Impact on Socioeconomic Development Factors

The projected impacts on the region of the tar sands development proposed in the low commercial development scenario are described in this section. A general summary of the socioeconomic impacts on the region is presented in Table 4.31. Regional impacts by industrial sector are included for employment in Table 4.32 (Sec. 4.2.1.1) and for wages and personal income in Table 4.33 (Sec. 4.2.1.2). In each instance, the projected impacts are expressed in terms of the difference between the baseline projections and the low commercial development scenario. Cumulative growth factors are presented in Table 4.31, along with the actual levels, to show the magnitude of change projected to occur between 1985 and 2005.

It is projected that the change in the population of the region would grow continually throughout the period, from 474 in 1985 to 15,034 in 2005.

Table 4.30 Comparison of Population and Household Impacts on the Reservation: High Commercial Development Scenario and Baseline Projections

Year and Cause of Change	Socioeconomic Development Category	
	Population Growth	Household Growth
1985		
Projected Baseline Increment	2,667	1,690
High Scenario		
Number	0	0
Percent of Total	0	0
1990		
Projected Baseline Increment	3,773	1,904
High Scenario		
Number	576	188
Percent of Total	13.2	9.0
1995		
Projected Baseline Increment	3,766	1,904
High Scenario		
Number	1,014	318
Percent of Total	21.2	14.3
2000		
Projected Baseline Increment	3,455	1,930
High Scenario		
Number	722	195
Percent of Total	17.3	9.2
2005		
Projected Baseline Increment	3,197	1,973
High Scenario		
Number	720	201
Percent of Total	18.4	9.2

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.31 Summary of Regional Socioeconomic Impacts by Category and Window Year for the Low Commercial Development Scenario

Socioeconomic Development Category	Change from Baseline, by Year					Cumulative Growth Factor[a]	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985–2005	1985–1995	1995–2005
Population								
Total	474	7,288	13,537	14,515	15,034	31.72	39.82	1.05
School-Age (5-17)	90	1,522	3,347	4,215	4,615	51.28	43.56	3.26
Retirement-Age (≥65)	0	121	271	459	475	-[b]	-[b]	5.77
Employment (No. of workers)	250	3,747	6,279	5,993	6,111	24.44	38.04	-0.27
Households (No. of units)	174	2,565	4,355	4,035	4,177	24.06	37.99	-0.42
Infrastructure Requirements								
Housing units								
Single family	106	1,542	2,605	2,423	2,509	23.67	37.74	-0.37
Multifamily	28	389	654	610	630	22.50	36.53	-0.37
Mobile homes	44	645	1,088	1,012	1,047	23.80	37.82	-0.38
Education								
Students	90	1,522	3,347	4,215	4,615	51.28	43.56	3.26
Classrooms	6	65	137	172	188	31.33	36.73	3.22
Teachers	6	65	137	172	188	31.33	36.73	3.22
Health Care								
Hospital beds								
General care	5	19	31	32	34	6.80	20.02	0.93
Long-term care	5	9	15	22	22	4.40	11.61	3.90
Medical personnel								
Doctors	5	9	13	13	13	2.60	10.03	0
Dentists	5	9	11	12	12	2.40	8.20	0.87
Nurses	5	16	26	28	30	6.00	17.92	1.44
Public health nurses	5	7	8	8	8	1.60	4.81	0
Mental health care								
Clinical psychologists	5	7	7	7	7	1.40	3.42	0
Mental health workers	5	7	7	7	7	1.40	3.42	0
Public Safety								
Law enforcement								
Police officers	5	9	31	32	34	6.80	20.02	0.93
Patrol cars	5	9	31	32	34	6.80	20.02	0.93
Jail space (sq ft)	238	3,647	6,770	7,260	7,520	31.60	39.77	1.06
Juvenile holding cells	5	7	7	8	8	1.60	3.42	1.34
Fire Protection								
Water flow (gpm)/ duration (hr)[c]								
Emergency Medical Service								
Ambulances	5	7	8	8	8	1.60	4.81	0
Emergency medical technicians	35	49	56	56	56	1.60	4.81	0
Utility Service Demands								
Water system								
Connections	155	2,354	4,372	4,687	4,852	31.30	39.65	1.05
Supply (10^6 gal/d)	91	1,375	2,553	2,737	2,834	31.14	39.57	1.05
Storage (10^6 gal/d)	45	687	1,277	1,369	1,417	31.49	39.73	1.05
Treatment (10^6 gal/d)	91	1,375	2,553	2,737	2,834	31.14	39.57	1.05
Sewage system (10^6 gal/d)	19	265	494	530	561	29.53	38.52	1.28
Solid waste[d]								

Table 4.31 (Cont'd)

Socioeconomic Development Category	Change from Baseline, by Year					Cumulative Growth Factor[a]	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Public Safety (Cont'd)								
Other Services								
Parks (acres)	5	47	86	89	93	18.60	32.91	0.79
Libraries								
Books	948	14,576	27,074	29,030	30,068	31.72	39.82	1.05
Space (sq ft)	238	3,647	6,770	7,260	7,520	31.60	39.77	1.06

[a]Computed as the ratio between 1985 and 2005.

[b]Undefined.

[c]Fire protection measured in water flow in fire hydrants (gpm)/duration (hr) cannot be aggregated across the affected counties. See Tables 4.52-4.58 for county-specific detail.

[d]The State of Utah community facility guidelines do not include a solid waste standard. Therefore, an estimate of solid waste disposal impacts could not be determined.

Most of this growth would take place between 1985 and 1995 when the population would increase at an annual rate of 39.82%. Table 4.31 indicates that school-age population and retirement-age population would both increase above the baseline at somewhat higher rates.

Total regional employment is also projected to grow rapidly over the baseline during the 1985-2005 period. In particular, employment would expand from 250 additional workers in 1985 to 6,111 in 2005. This 2005 employment level is 24 times that projected to be required in 1985. Again, this increase would be most dramatic from 1985 to 1995. In this period, total employment would rise 38.04% annually; in the next 10 years there would actually be a negative change, -0.27% annually. Regional employment growth by industrial sector is described in Sec. 4.2.1.1.

The number of households would grow from 174 more than baseline in 1985 to 4,355 more than baseline in 1995, but it would then drop to 4,177 more than baseline in 2005. The change in housing demands would increase slightly more rapidly for mobile homes than single family houses or multifamily houses between 1985 and 1995, but the change in all housing demands would decline 0.40% annually between 1995 and 2005. Housing demand would total 2,509 single-family units, 630 multifamily units, and 1,047 mobile homes more than the baseline projections in 2005.

Six more classrooms and teachers in 1985, and 188 more classrooms and teachers in 2005, would be needed to accommodate the change in the number of students from the baseline projections between 1985 and 2005. The change in the number of students would be 51 times greater in 2005 than in 1985, with most of this growth taking place from 1985 to 1995.

The demand for each type of health care service would be between two and six times greater than the baseline projections in 1985. By 2005, this demand would increase to 34 general care hospital beds, 30 nurses, 22 long-term care hospital beds, 13 doctors, 12 dentists, 8 public health nurses, and seven clinical psychologists and mental health workers. Only the number of nurses would increase between 2000 and 2005.

The additional demand for jail space attributable to the low commercial scenario would increase much more rapidly than the demand for any other public safety service. The 3,647 square feet needed for jail space in 1990 would be 15 times greater than the amount of jail space in 1985. Five more police officers and patrol cars would be needed in 1985, increasing to 34 in 2005. The five ambulances and juvenile holding cells required by the low scenario developments would grow to eight in 2005.

The change in water system service demands would grow by a factor of 31 between 1985 and 2005. Similarly, sewage system requirements would increase from 19 million gallons in 1985 to 561 million gallons in 2005. All utility service demands would increase about 39% annually from 1985 to 1995 and about 1% annually from 1995 to 2005.

Five more acres of parks would be demanded by the low scenario in 1985, rising to 93 acres in 2005. Library services would increase at a rate slightly higher than utility services. Over 30,000 books and 7,500 square feet of space would be needed for libraries in 2005.

4.2.1.1 Regional Employment Impacts by Sector

Table 4.32 describes the total regional employment impacts of the low commercial development scenario. It is anticipated that the number of workers needed as a result of the low scenario projects would climb from 250 in 1985 to 6,111 in 2005. This change would occur at an annual rate of increase of 38.04% between 1985 and 2005, and an annual decrease of 0.27% between 1995 and 2005.

Agriculture employment would remain at baseline levels throughout the 20 year period. Conversely, mining employment would start at the baseline level in 1985 and grow to 3,151 in 2000. In 2000 and 2005, the mining sector would have the greatest number of workers attributable to the low scenario. Employment growth in the mining sector would have the greatest proportion of workers associated with the low scenario activities. The change in employment in the mining sector would be one of the most rapid in the region; second largest absolute change in the 1985 to 1995 period, and the largest change in the 1995 to 2005 period.

Contract construction is forecast to experience substantial shifts as a result of the low commercial development scenario. Employment in contract construction would increase 27.86% annually from 1985 to 1995 and then

Table 4.32 Total Regional Employment Impacts by Industrial Sector as a Result of the Low Commercial Development Scenario[a]

Industry Sector	Change in Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	0	0
Mining	0	983	1,810	3,151	3,151	-[b]	5.70
Contract Construction	182	1,562	2,126	154	160	27.86	-22.79
Manufacturing	0	20	41	45	46	-[b]	1.16
Transportation, Communication, and Utilities	4	54	104	129	122	38.52	1.61
Wholesale and Retail Trade	20	319	606	671	694	40.65	1.37
Finance, Insurance, and Real Estate	4	45	90	102	109	36.53	1.93
Services	12	197	393	457	475	41.75	1.91
Government	23	359	700	836	884	40.71	2.36
Nonfarm Proprietors	9	211	409	455	472	46.47	1.44
Total	250	3,747	6,279	5,993	6,111	38.04	-0.27

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

decrease 22.79% annually from 1995 to 2005. In 1985 through 1995, the contract construction employment due to the low commercial scenario would be the largest in the county.

There would be little change in employment in the manufacturing sector. The 46 additional manufacturing workers in 2005 would be less than any other sector. Employment in the finance, insurance, and real estate sector would be second lowest, reaching a peak of 109 in 2005.

The wholesale and retail trade sector is projected to increase at an annual rate of 40.65% from 1985 to 1995 as a result of the low scenario. In the following 10 years such employment would increase 1.37% annually. Wholesale and retail trade would have the third largest change in employment from the baseline of any sector in the year 2005.

Employment in transportation, communication, and utilities would increase from four in 1985 to 129 in 2000. Employment in the sector would decrease to 122 in 2005.

The services and nonfarm proprietors sectors would have similar employment produced by the low commercial development scenario throughout the 20 year period. Services employment would be 40 times greater in 2005 than in 1985. Nonfarm proprietors employment would be 52 times greater in 2005 than in 1985.

Finally, employment in the government sector would be 884 workers greater than the baseline employment in 2005, the second largest in the region. The number of workers in the sector would increase 40.71% annually from 1985 to 1995 and 2.36% annually from 1995 to 2005.

4.2.1.2 Regional Impact on Total Wage and Personal Income

The total regional wage and personal income effects of the low scenario developments are presented in Table 4.33. The wage and income data are presented by industrial sector and income category. Average monthly wages are assumed to have an approximate annual increase in monthly wages of 1.72%, independent of the scenario otherwise noted. The number of employees and total wage payments would increase as a result of the low commercial scenario developments and are expressed as a change from the baseline projections. Each industrial sector is briefly discussed in the following paragraphs.

The average monthly wage in the mining sector would increase from $2,157 in 1985 and to $3,036 in 2005. The resulting total wage payment in the sector would increase from $2.3 million in 1990 to $9.6 million in 2005, the largest of any sector. Growth in total wage payments between 1995 and 2005 would be the most rapid of any sector, increasing at an annual rate of 7.52%.

Contract construction would have the highest monthly wage of any sector, rising from $2,625 in 1985 to $3,695 in 2005. The total wage payment in the sector would increase 29.85% annually from 1985 to 1995 and decrease 21.46% annually from 1995 to 2005.

In the manufacturing sector, the average monthly wage would grow from $893 in 1985 to $1,257 in 2005. The total wage payment of $57,822 in 2005 would represent an increase of 197% from the 1990 total. Nonetheless, the change in the total sectoral wage payment in the year 2005 would be the smallest of any sector.

The average monthly wage in the transportation, communication, and utilities sector would increase from $1,879 in 1989 to $2,724 in 2005. Between 1985 and 1995 the average monthly wage would increase 2.02% annually, faster than the increase in most other sectors. Total monthly wage payments resulting from the low commercial development scenario would grow from $7,516 in 1985 to $332,328 in 2005.

Wages in the wholesale and retail trade sector would rise from $844 per month in 1985 to $1,188 per month in 2005. Total wage payments would increase

Table 4.33 Total Regional Wage and Personal Income Impact Projections by Industrial Sector as a Result of the Low Commercial Development Scenario[a]

Industrial Sector and Income Categories	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Mining							
Average Monthly Wage (1980 $)	2,157	2,349	2,559	2,787	3,036	1.72	1.72
Change from Baseline							
Number of Employees	0	983	1,810	3,151	3,151	-[b]	5.70
Total Wage Payment (1980 $)	0	2,309,067	4,631,790	8,781,837	9,566,436	-[b]	7.52
Contract Construction							
Average Monthly Wage (1980 $)	2,625	2,859	3,114	3,367	3,695	1.72	1.73
Change from Baseline							
Number of Employees	185	1,562	2,126	154	160	22.26	-22.79
Total Wage Payment (1980 $)	485,625	4,465,758	6,620,364	518,518	591,200	29.85	-21.46
Manufacturing							
Average Monthly Wage (1980 $)	893	973	1,060	1,154	1,257	1.73	1.72
Change from Baseline							
Number of Employees	0	20	41	45	46	-[b]	1.16
Total Wage Payment (1980 $)	0	19,460	43,460	51,930	57,822	-[b]	2.90
Transportation, Communications, and Utilities							
Average Monthly Wage (1980 $)	1,879	2,047	2,296	2,501	2,724	2.02	1.72
Change from Baseline							
Number of Employees	4	54	104	119	122	38.52	1.61
Total Wage Payment (1980 $)	7,516	110,538	238,784	297,619	332,328	41.32	3.36
Wholesale and Retail Trade							
Average Monthly Wage (1980 $)	844	919	1,002	1,091	1,188	1.73	1.72
Change from Baseline							
Number of Employees	20	319	606	671	694	40.65	1.37
Total Wage Payment (1980 $)	16,880	293,161	607,212	732,061	824,472	43.09	3.11
Finance, Insurance, and Real Estate							
Average Monthly Wage (1980 $)	925	1,007	1,097	1,195	1,302	1.72	1.73
Change from Baseline							
Number of Employees	4	45	90	102	107	36.53	1.75
Total Wage Payment (1980 $)	3,700	45,315	98,730	121,890	139,314	38.88	3.50
Services							
Average Monthly Wage (1980 $)	767	835	910	991	1,079	1.72	1.72
Change from Baseline							
Number of Employees	12	197	393	457	475	41.75	1.91
Total Wage Payment (1980 $)	9,204	164,495	357,630	452,887	512,525	44.19	3.66
Government							
Average Monthly Wage (1980 $)	931	1,014	1,144	1,246	1,357	2.08	1.72
Change from Baseline							
Number of Employees	23	359	700	836	884	40.71	2.36
Total Wage Payment (1980 $)	21,413	364,026	800,800	1,041,656	1,199,588	43.64	4.12
Nonfarm Proprietors (NFP)							
Average Monthly Wage (1980 $)	1,230	1,340	1,459	1,590	1,731	1.72	1.72
Change from Baseline							
Number of Employees	9	211	409	455	472	46.47	1.44
Total Wage Payment (1980 $)	11,070	282,740	596,731	723,450	817,032	48.99	3.19
Other Labor Income (OLI)							
Average Monthly OLI (1980 $)	106	115	126	137	149	1.74	1.69
Change from Baseline							
Number of Recipients	274	3,588	6,086	5,982	6,122	36.35	0.06
Total OLI (1980 $)	29,044	412,620	766,836	816,534	912,178	38.73	1.75

Table 4.33 (Cont'd)

Industrial Sector and Income Categories	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Other Labor Income (Cont'd)							
Average Property Income (1980 $)	141	156	170	185	202	1.89	1.74
Population	550	7,288	13,537	14,515	15,034	37.76	1.05
Total Property Income (1980 $)	77,550	1,136,928	2,301,290	2,685,275	3,036,868	40.36	2.81
Total Monthly Personal Income (1980 $)	662,002	9,604,108	17,063,627	16,226,657	17,989,763	38.40	0.53
Average Monthly Per Capita Income (1980 $)	1,204	1,318	1,261	1,118	1,197	-0.46	-0.52

[a]The number of employees by industrial sector presented in this table may not equal the total industrial sector employment presented in Table 4.32 because these personal income projections may include communities that are not in the critical impact area (i.e., do not satisfy the 5% growth criteria).

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

by a factor of 49 between 1985 and 2005. The total monthly wage payment in the sector of $824,472 would be the third largest produced by the low commercial development scenario.

The average monthly wage in the finance, insurance, and real estate sector would increase from $925 in 1985 to $1,302 in 2005. Total monthly wage payments would grow at annual rates of 38.88% from 1985 to 1995 and 3.50% from 1995 to 2005, reaching a total of $139,314 in 2005.

In the services sector, the average monthly wage would increase from $767 in 1985 in $1,079 in 2005. The wage in this sector would be the lowest of any sector throughout the 20 year period. Total monthly wage payments due to the low scenario would be $512,525 in 2005 — 56 times greater than the total wages paid in 1985.

With annual increases of 2.08% from 1985 to 1995 and 1.72% from 1995 to 2005, the average monthly wage in the government sector would grow more rapidly than in any other sector. The average wage would be $1,357 per month in 2005. Total monthly wage payments would grow from $21,413 in 1985 to $1,199,588 in 2009. In 2005, the total wages payment would be second only to the mining sector.

Nonfarm proprietors would have monthly wages of $1,230 in 1985 and $1,731 in 2005. The 48.99% annual increase from 1985 to 1990 in total wage payments would be the largest of any sector. Total monthly wages paid would grow from $11,070 in 1985 and $817,032 in 2005.

Other labor income would increase from $106 monthly in 1985 to $149 in 2005. As the number of recipients would be 22 times greater in 2005 than in 1985, total other labor income would grow from $29,044 to $912,178 during the 20 year period.

Average property income would increase from $141 in 1985 to $202 in 2005. Total property income would increase by a factor of 39 during the same period.

The total monthly personal income in the region, as a result of the low commercial scenario developments, would grow from $662,002 in 1985 to $17,989,763 in 2005. Most of this increase would occur from 1985 to 1995, with only an 0.53% annual increase thereafter. The average monthly per capita income would fluctuate throughout the 20 year period, eventually declining seven dollars between 1985 and 2005.

4.2.2 County-Level Socioeconomic Impact Analysis of the Nine STSA Developments

The projected impacts of the tar sands projects in the low commercial development scenario on each county are described in this section. Population, household, economic base, employment, housing, public and private infrastructure, fiscal, social and cultural, recreational, and Indian reservation impacts are discussed. In each instance, the projected impacts are expressed in terms of the difference between the baseline projections and the low commercial development scenario.

4.2.2.1 Population and Housing Impacts

Figure 4.3 illustrates the change in population that would occur in each county due to the tar sands projects proposed under the low commercial development scenario. A summary of the population and household impacts in each county is presented in Table 4.34. Further detail of the population and household impacts by community and CCD can be found in Tables 4.35 through 4.41. Only those CCDs where significant changes would occur are included separately, but all CCDs are included in the county totals presented in Table 4.34. All projections are presented as a change from the baseline forecast and thereby, only reflect the population and household growth attributable to the development of the low commercial scenario projects in the region.

Carbon County

Carbon County is forecast to experience the greatest growth in population under the low development scenario. The additional population attributable to the low scenario would total 9,137 in 2005, an increase of 120 times over 1985. The highest rate of increase (107.09% annually) would occur

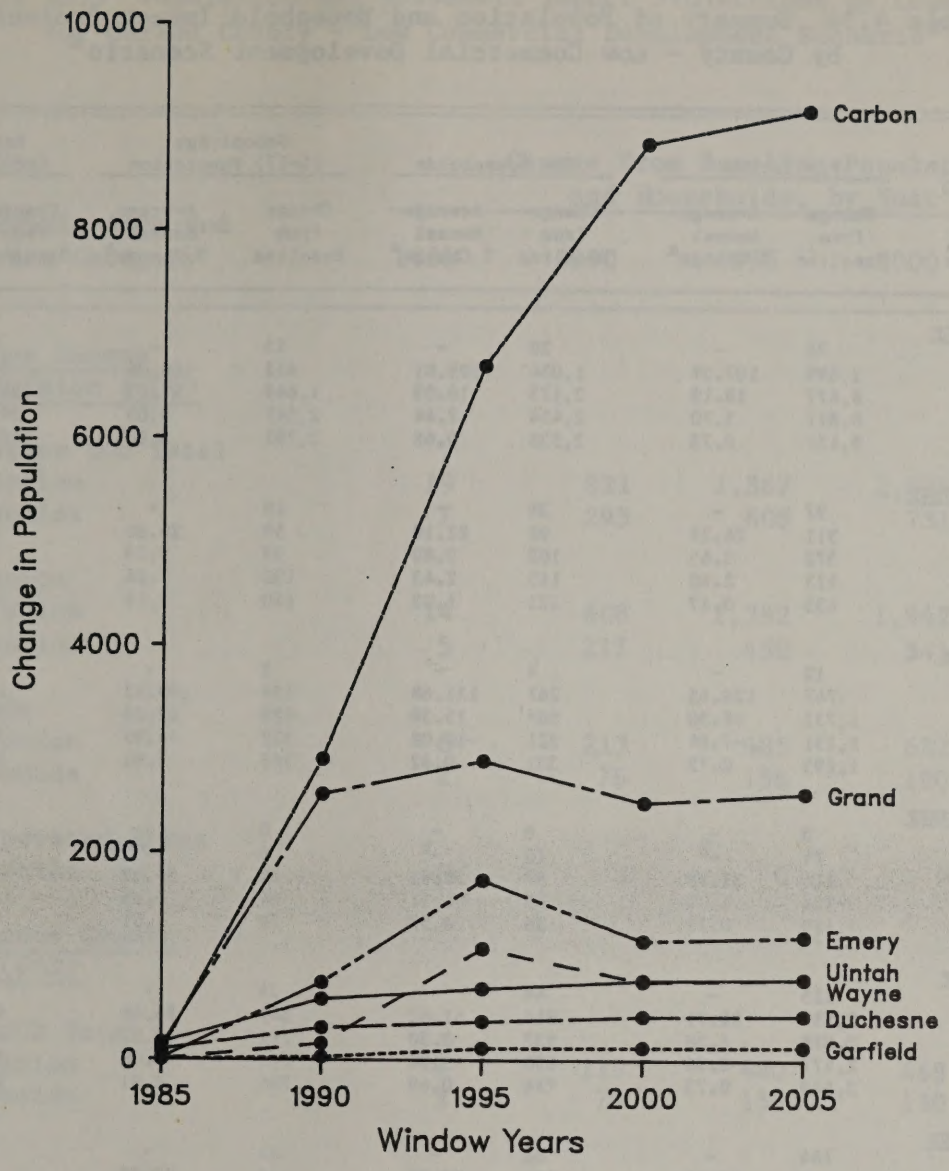

Fig. 4.3 Change in County Populations Due to the Low Commercial Development Scenario

between 1985 and 1990. School-age population would grow somewhat more rapidly than the total population, while the number of households would grow slightly less rapidly. Retirement-age population would jump from the baseline level in 1985 to 292 more in 2005.

The distribution of the change in population in the county from the low commercial development scenario would generally reflect the distribution projected in the high scenario. The East Carbon CCD would have the fastest growth in population. The cities of East Carbon and Sunnyside would have additional populations of 2,009 and 706, respectively, in 2005 due to the low scenario. The population of the incorporated area in the CCD would remain at

Table 4.34 Summary of Population and Household Impact Projections by County - Low Commercial Development Scenario[a]

County and Window Years	Population		New Households		School-Age (5-17) Population		Retirement-Age (≥65) Population	
	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]
Carbon County								
1985	76	-	28	-	15	-	0	-
1990	2,895	107.09	1,034	105.81	612	109.96	54	-[b]
1995	6,677	18.19	2,175	16.03	1,649	21.93	141	21.16
2000	8,811	5.70	2,454	2.44	2,541	9.03	293	15.75
2005	9,137	0.73	2,538	0.68	2,792	1.90	292	-0.07
Duchesne County								
1985	97	-	36	-	18	-	0	-
1990	311	26.24	98	22.18	59	26.80	0	-[b]
1995	372	3.65	102	0.80	93	9.53	2	-[b]
2000	423	2.60	115	2.43	132	7.26	6	24.57
2005	433	0.47	121	1.02	140	1.18	12	14.87
Emery County								
1985	12	-	4	-	2	-	0	-
1990	747	128.45	267	131.68	158	139.62	14	-[b]
1995	1,731	18.30	564	15.38	428	22.06	37	21.45
2000	1,151	-7.84	321	-10.08	332	-4.95	38	0.53
2005	1,193	0.72	331	0.62	365	1.91	38	0
Garfield County								
1985	0	-	0	-	0	-	0	-
1990	29	-[b]	10	-[b]	6	-[b]	1	-[b]
1995	114	31.49	37	29.91	28	36.08	2	14.87
2000	124	1.70	35	-1.11	36	5.15	4	14.87
2005	129	0.79	36	0.57	39	1.61	4	0
Grand County								
1985	125	-	46	-	24	-	0	-
1990	2,559	82.91	914	81.82	541	86.46	48	-[b]
1995	2,878	2.38	937	0.50	711	5.62	61	4.91
2000	2,477	-2.96	690	-5.94	714	0.08	82	6.10
2005	2,569	0.73	714	0.69	785	1.91	82	0
Uintah County								
1985	164	-	60	-	31	-	0	-
1990	588	29.09	185	25.26	112	29.29	1	-[b]
1995	689	3.22	190	0.53	172	8.96	5	37.97
2000	771	2.27	209	1.92	241	6.98	11	17.08
2005	787	0.41	219	0.94	254	1.06	22	14.87
Wayne County								
1985	0	-	0	-	0	-	0	-
1990	159	-[b]	57	-[b]	34	-[b]	3	-[b]
1995	1,076	46.58	350	43.76	266	53.10	23	50.29
2000	758	-6.77	211	-9.63	219	-3.81	25	1.68
2005	786	0.73	218	0.65	240	1.85	25	0

[a]Computed as average annual compound percent change from previous window year.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.35 Population and Household Impact Projections by Community for Carbon County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
East Carbon Census County Division (CCD)					
East Carbon CCD Total					
Population	19	821	1,867	2,624	2,715
Households	7	293	608	731	754
East Carbon					
Population	14	608	1,382	1,942	2,009
Households	5	217	450	541	558
Sunnyside					
Population	5	213	485	682	706
Households	2	76	158	190	196
Unincorporated Areas					
Population	0	0	0	0	0
Helper Census County Division (CCD)					
Helper CCD Total					
Population	7	219	480	468	482
Households	3	78	156	130	134
Helper					
Population	4	131	288	281	289
Households	2	47	94	78	80
Scofield					
Population	0	0	0	0	0
Unincorporated Areas					
Population	3	88	192	187	193
Households	1	31	62	52	54
Price Census County Division (CCD)					
Price CCD Total					
Population	49	1,855	4,331	5,719	5,940
Households	18	663	1,411	1,593	1,650

Table 4.35 (Cont'd)

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year				
	1985	1990	1995	2000	2005
Price Census County Division (CCD) (Cont'd)					
Price					
Population	32	1,206	2,815	3,717	3,861
Households	12	431	917	1,035	1,073
Wellington					
Population	9	334	780	1,029	1,069
Households	3	119	254	287	297
Hiawatha					
Population	0	0	0	0	0
Unincorporated Areas					
Population	8	315	736	972	1,010
Households	3	113	240	271	281

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

baseline levels. The Price CCD would have the largest increase in population, growing from 49 in 1985 to 5,940 in 2005. Price would have about two-thirds of the additional population, with Wellington and the unincorporated areas of the CCD dividing the remainder. In the Helper CCD, Helper would have 289 more people, the unincorporated areas would have 193 more people, and Scofield would remain at its baseline level in 2005. The change in the number of households would shift with the change in population throughout the county.

Duchesne County

The population of Duchesne County is projected to increase as a result of the low scenario, throughout the 20 year period. The rate of population

increase, however, would decrease during the same period. This is clearly illustrated in Table 4.34 and Fig. 4.3 where the population expands rapidly between 1985 and 1990 (26.24%) but then the rate of growth declines from 3.65% annually to 0.47%. The number of new households would grow from 36 in 1985 to 121 in 2005. School-age population would increase 678% between 1985 and 2005. Retirement-age population would grow from zero in 1990 to 12 in 2005.

Almost all of the change in population would occur in the Roosevelt CCD. Of the 433 additional people in the county in 2005, 425 are projected to reside in the Roosevelt CCD. The city of Roosevelt would account for over half of this growth, while the unincorporated areas and Myton would have lesser amounts. The change in the Duchesne CCD would increase from one person and no households in 1985 to eight people and two households in 2005. All of this growth would take place in the city of Duchesne (see Table 4.36).

Emery County

The change in the population of Emery County attributable to the low commercial scenario would jump from 12 in 1985 to 1,731 in 1990, but it would then decline to 1,193 in 2005. The net result would be a population increase of almost 100 times that projected for 1985 during the 20 year period. Table 4.34 shows that the number of households would follow a similar pattern, albeit with exaggerated increases and decreases. School-age population would grow more rapidly than total population, climbing from two in 1985 to 365 in 2005. Retirement-age population would increase from zero in 1985 to 37 in 1995 and would change little thereafter.

As seen in Table 4.37, the largest change in the county population would occur in the Castle Dale-Huntington CCD, but the fastest change would occur in the Green River CCD. In the Castle Dale-Huntington CCD, the population would total 705 in 2005. The cities of Castle Dale, Huntington, and Orangeville would experience the greatest changes, while Cleveland, the unincorporated areas, and Elmo would change by lesser amounts. In the Green River CCD, population would grow by a factor of 269 from 1985 to 1995, after which it would drop by 50%. Of the 454 additional people in the CCD in 2005, 390 would be in Green River and 64 would be in the unincorporated areas. The Emery-Ferron CCD is expected to experience much less change. Ferron would incur about three-fourths of the projected population change and Emery would be impacted with the remainder.

Garfield County

The additional population of Garfield County generated by the low scenario would jump from zero in 1985 to 114 in 1995. Between 1995 and 2005, the population would continue to increase, but at less than 1% annually. The number of households would grow from zero in 1985 to 37 in 1995 and fluctuate thereafter. School-age population would have highest rate of growth during

Table 4.36 Population and Household Impact Projections by Community for Duchesne County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Duchesne Census County Division (CCD)					
Duchesne CCD Total					
Population	1	5	6	7	8
Households	0	2	2	2	2
Duchesne					
Population	1	5	6	7	8
Households	0	2	2	2	2
Unincorporated Areas					
Population	0	0	0	0	0
Roosevelt Census County Division (CCD)					
Roosevelt CCD Total					
Population	96	306	366	416	425
Households	35	97	101	113	118
Roosevelt					
Population	58	184	220	250	255
Households	21	58	61	68	71
Myton					
Population	3	9	11	12	13
Households	1	3	3	3	4
Altamont					
Population	0	0	0	0	0
Unincorporated Areas					
Population	36	113	135	154	157
Households	13	36	37	42	44

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.37 Population and Household Impact Projections by Community for Emery County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Castle Dale-Huntington Census County Division (CCD)					
Castle Dale-Huntington CCD Total					
Population	8	385	622	681	705
Households	3	138	203	190	196
Castle Dale					
Population	3	135	218	238	247
Households	1	48	71	67	69
Cleveland					
Population	0	23	37	41	42
Households	0	8	12	11	12
Elmo					
Population	0	15	25	27	28
Households	0	6	8	8	8
Huntington					
Population	2	96	156	170	176
Households	1	35	51	48	49
Orangeville					
Population	2	96	156	170	176
Households	1	35	51	48	49
Unincorporated Areas					
Population	0	19	31	34	35
Households	0	7	10	10	10
Emery-Ferron Census County Division (CCD)					
Emery-Ferron CCD Total					
Population	0	67	33	32	33
Households	0	24	11	9	9
Clawson					
Population	0	0	0	0	0

Table 4.37 (Cont'd)

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Emery-Ferron Census County Division (CCD) (Cont'd)					
Emery					
Population	0	17	8	8	8
Households	0	6	3	2	2
Ferron					
Population	0	50	25	24	25
Households	0	18	8	7	7
Unincorporated Areas					
Population	0	0	0	0	0
Green River Census County Division (CCD)					
Green River CCD Total					
Population	4	295	1,076	438	454
Households	1	105	350	122	126
Green River					
Population	3	254	925	377	390
Households	1	90	301	105	108
Unincorporated Areas					
Population	1	41	151	61	64
Households	0	15	49	17	18

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

any five year period; between 1990 and 1995 the change would be 36.08%. The change in retirement-age population would be small, growing from zero in 1985 to four in 2005.

All of the population in the county would be in the Escalante CCD (Table 4.38). About 90% of the change would be in Escalante. The rest of the additional population would be in Boulder; the unincorporated areas would remain at baseline levels. Households would be distributed the same as the population.

Table 4.38 Population and Household Impact Projections by Community for Garfield County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Escalante Census County Division (CCD)					
Escalante CCD Total					
Population	0	29	114	124	129
Households	0	10	37	35	36
Boulder					
Population	0	3	11	12	13
Households	0	1	4	4	4
Escalante					
Population	0	26	103	112	116
Households	0	9	33	32	32
Unincorporated Areas					
Population	0	0	0	0	0

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Grand County

In Grand County, the population produced by the low commercial development scenario would swell from 125 in 1985 to 2,559 in 1990 -- an 82.91% annual increase. Table 4.34 shows that the population would then shift up and down before settling at 2,569 additional people in 2005. The number of new households would grow less rapidly than total population, but school-age population would grow continuously during the 20 year period. Retirement-age population would increase from zero in 1985 to 82 in 2000.

Over 95% of the change in population in the county would occur in the Thompson CCD. The population of the CCD would total 2,453 in 2005. The number of households would grow to 681 in the same year (see Table 4.39).

Uintah County

The population of Uintah County would increase from 164 above baseline in 1985 to 787 above baseline in 2005. This growth would be continuous, but at declining rates throughout the period (see Table 4.34). Similarly, the number of new households would grow from 60 in 1985 to 219 in 2005. School-age population would grow more rapidly than total population, especially

Table 4.39 Population and Household Impact Projections by Community for Grand County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Thompson Census County Division (CCD)					
Thompson CCD Total					
Population	123	2,510	2,770	2,369	2,453
Households	45	896	902	660	681

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

between 1995 and 2005. Retirement-age population would at least double every five years during the 20 year period, reaching 22 in 2005.

Table 4.40 indicates that the change in population in the county would be split roughly evenly between the Uintah Ouray CCD and the Vernal CCD. About two-thirds of the growth in the Uintah Ouray CCD would occur in the unincorporated areas, while the rest would take place in Ballard. In the Vernal CCD, the change in population and households would be divided equally between the city of Vernal and the unincorporated areas.

Wayne County

In Wayne County, the low commercial development scenario would result in sudden shifts in population during the 20 year period. Population, shown in Table 4.34, would grow from zero in 1985 to 1,076 in 1995, but it would drop to 786 in 2005. The number of new households and school-age population would follow this trend. Households, however, would increase slightly less rapidly then total population, while school-age population would increase slightly more rapidly. Retirement-age population would jump from three in 1990 to 23 in 1995, with little change between 1995 and 2005.

All of the changes in Wayne County would occur in the Hanksville CCD (see Table 4.41).

4.2.2.2 Economic Base and Employment Impacts

The projected changes to the economic base and employment of the counties in the region are described in this section. Figure 4.4 illustrates the change in employment for each county caused by the low commercial development scenario. Table 4.42 provides a summary of the total employment impacts by county. As stated previously, the employment effects of the low scenario tar sands projects are presented herein as a change from the baseline conditions.

Total Employment Impacts by County

All seven counties are forecast to realize an increase in total employment over the baseline in each window year; four counties are forecast to realize a continuous increase in employment throughout the study period while three counties are projected to grow through 1995 before declining.

Carbon and Grand counties would experience particularly rapid employment growth in the 1985-1995 time frame; their annual growth rate would be 54.85% and 34.74%, respectively. Besides a large percentage growth, the actual level of employment in these two counties, from the development of the low scenario projects, is also large. This is evidenced by the fact that in

Table 4.40 Population and Household Impact Projections by Community for Uintah County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Uintah Ouray Census County Division (CCD)					
Uintah-Ouray CCD Total					
Population	51	322	363	394	400
Households	19	102	100	107	111
Ballard					
Population	20	129	145	158	160
Households	8	41	40	43	44
Unincorporated Areas					
Population	31	193	218	236	240
Households	11	61	60	64	67
Vernal Census County Division (CCD)					
Vernal CCD Total					
Population	113	267	326	377	387
Households	42	84	90	102	108
Vernal					
Population	57	134	163	189	194
Households	21	42	45	51	54
Unincorporated Areas					
Population	57	134	163	189	194
Households	21	42	45	51	54

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.41 Population and Household Impact Projections by Community for Wayne County - Low Commercial Development Scenario[a]

Geographic Area and Impact Category	Change from Baseline Population and Households, by Year[b]				
	1985	1990	1995	2000	2005
Hanksville Census County Division (CCD)					
Hanksville CCD Total					
Population	0	159	1,076	758	786
Households	0	57	350	211	218

[a]Only those county census divisions (CCDs) and communities that satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 4.34).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

the year 1995 the employment level in Carbon County is projected to be 3,330 workers above the baseline, while in Grand County the employment level would be 1,361 workers above the baseline. Only Carbon County is expected to realize large employment growth through the year 2005, with 3,913 more workers than that projected under the baseline conditions. Duchesne, Garfield, and Uintah counties are the other counties expected to realize employment growth throughout the period; 92 workers above the baseline are projected in 2005 for Duchesne, 52 in Garfield, and 405 in Uintah.

Three counties are forecast to have no additional employment due to the low scenario tar sands projects in 1985 but expand substantially between 1985 and 1995. Emery County is expected to have 290 additional workers in 1995, 49 additional workers are projected for Garfield County, and 790 in Wayne County. Each of these counties but Garfield County, however, is projected to realize a decrease in employment requirements between 1995 and 2005. This is shown in Table 4.42.

Figure 4.4 graphically illustrates these county employment trends. Carbon County is expected to absorb the greatest amount of employment growth: precipitating this growth is the Sunnyside STSA, the largest tar sand development included in the low commercial scenario. Employment in the region as a whole would rise from 250 workers above the baseline in 1985 to a level

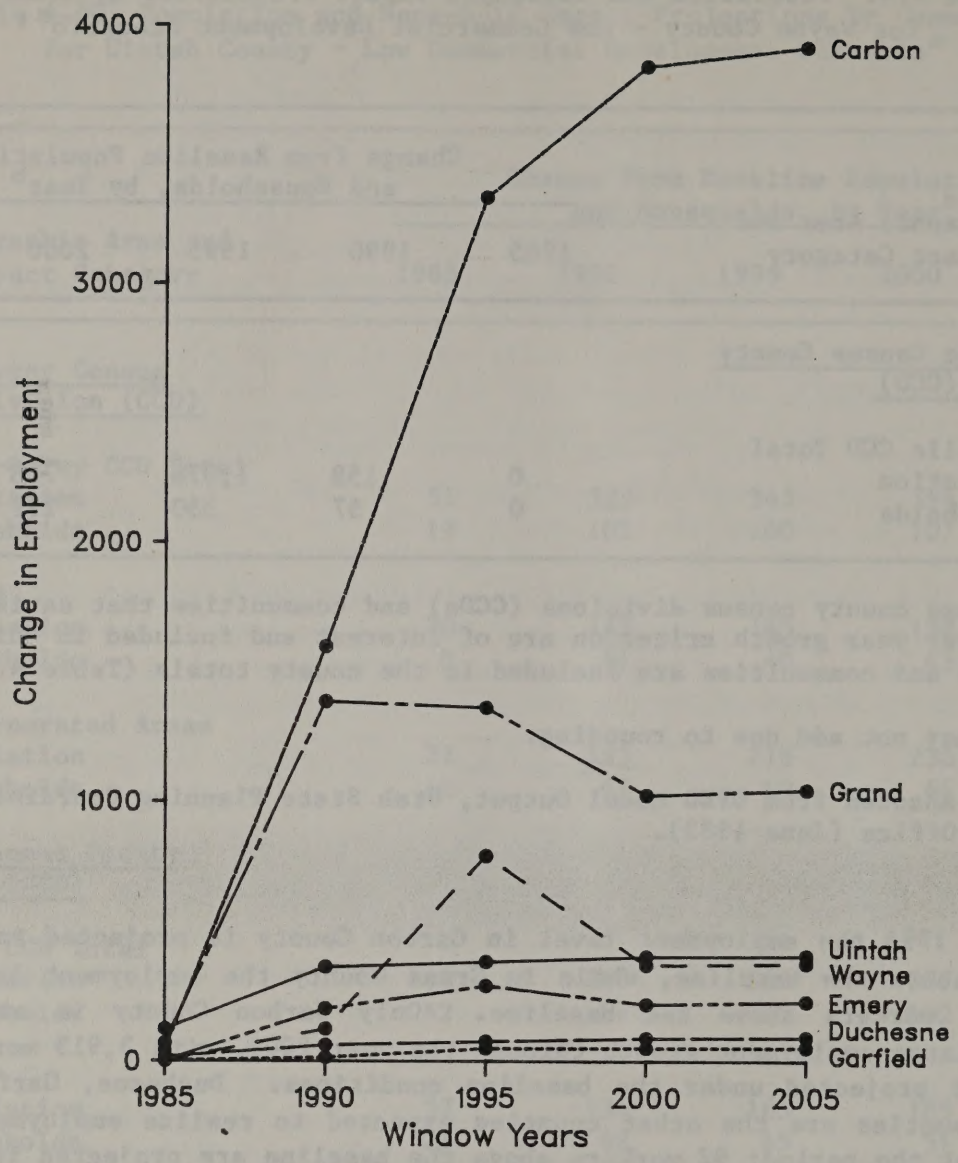

Fig. 4.4 Change in County Employment Levels Due to the Low Commercial Development Scenario

of 6,111 more workers in 2005. This would represent a 38.04% annual growth rate in the 1985-1995 period followed by a negative 0.27% rate of change in the 1995-2005 time frame. Carbon County would account for around 65% of the regional employment growth in 2005.

Employment Impacts by Industrial Sector

A description of the employment impacts by industrial sector is presented in Tables 4.43 through 4.49. A discussion of each county impact is presented below.

Table 4.42 Summary of Total Employment Growth by County Resulting from the Low Commercial Development Scenario

County	Change in Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Carbon County	42	1,597	3,330	3,838	3,913	54.85	1.63
Duchesne County	16	62	76	89	92	16.86	1.93
Emery County	0	202	290	219	229	-[b]	-2.33
Garfield County	0	14	49	51	52	-[b]	0.60
Grand County	69	1,385	1,361	1,023	1,044	34.74	-2.62
Uintah County	123	363	383	403	405	12.03	0.59
Wayne County	0	124	790	370	376	-[b]	-7.16
Total	250	3,747	6,279	5,993	6,111	38.04	-0.27

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Carbon County

The employment generated by the low commercial scenario would increase by a factor of 93 in Carbon County between 1985 and 2005. Employment would total 3,913 workers in the county in 2005, well over 60% of the total change in employment in the region. The growth rates from 1985 to 1995 and from 1995 to 2005 would be the highest and second highest, respectively, of any county in the region.

Table 4.43 indicates that the contract construction sector would have the greatest change from baseline employment in 1985, 1990, and 1995. Mining would have the greatest change in 2000 and 2005, accounting for about half of the total employment of the county. The services sector would increase at an annual rate of 60.72% between 1985 and 1995, the highest rate of any sector. The 8.45% annual increase in the mining sector between 1995 and 2005 would be the greatest of any sector. Contract construction would be the only sector to have a decrease in employment from 1995 to 2005, falling at an annual rate of 21.96%.

Table 4.43 Changes in Carbon County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	501	888	1,999	1,999	-[b]	8.45
Contract Construction	28	539	1,157	94	97	45.08	-21.96
Manufacturing	0	10	23	31	32	-[b]	3.36
Transportation, Communication, and Utilities	1	24	55	74	77	49.29	3.42
Wholesale and Retail Trade	4	141	321	429	445	55.04	3.32
Finance, Insurance, and Real Estate	1	22	51	69	72	48.17	3.51
Services	2	97	230	313	325	60.72	3.52
Government	5	169	388	535	562	54.52	3.77
Nonfarm Proprietors	2	94	217	293	304	59.79	3.43
Total	42	1,597	3,330	3,838	3,913	54.85	1.63

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Duchesne County

Total employment would increase by 16 workers in 1985 and 92 in 2005 as a result of the low commercial development scenario. While the annual increase of 16.86% between 1985 and 1995 would be the second smallest in the region, the annual increase of 1.93% between 1995 and 2005 would be the greatest in the region. Duchesne County would be one of only two counties to have less than 100 additional workers in 2005.

Table 4.44 illustrates that the government sector and the wholesale and trade sector would have the largest employment of any sector throughout the 20 year period. There would be no changes in agriculture or mining, and the five other sectors would have changes of less than 10 workers. Nonfarm proprietors would be the fastest growing sector between 1985 and 1995. Government would be the fastest growing sector between 1995 and 2005.

Table 4.44 Changes in Duchesne County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	_[b]	_[b]
Mining	0	0	0	0	0	0	_[b]
Contract Construction	1	3	4	5	5	14.87	2.26
Manufacturing	0	2	2	2	2	_[b]	0
Transportation, Communication, and Utilities	1	3	3	4	4	11.61	2.92
Wholesale and Retail Trade	5	21	24	27	27	16.98	1.18
Finance, Insurance, and Real Estate	1	3	3	4	4	11.61	2.92
Services	2	9	11	13	13	18.59	1.68
Government	5	17	22	28	30	15.97	3.15
Nonfarm Proprietors	1	6	7	8	8	21.48	1.34
Total	16	62	76	89	92	16.86	1.93

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Emery County

Table 4.45 shows that the total employment in Emery County attributable to the low commercial development scenario is projected to rise and then fall between 1985 and 2005. Employment would jump from zero workers in 1985 to a peak of 290 workers in 1995. It would then decrease, at an annual rate of 2.33%, to 229 workers in 2005.

Contract construction would have the greatest change from baseline employment in 1990. Government would have the greatest change in subsequent window years. Employment in the manufacturing; transportation, communication, and utilities; finance, insurance, and real estate; services; and government sectors would double between 1990 and 2005. In Emery County, as with all other counties, the agriculture sector would remain at baseline levels throughout the 20 year period.

Table 4.45 Changes in Emery County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	21	21	21	21	-[b]	0
Contract Construction	0	77	17	12	13	-[b]	-2.65
Manufacturing	0	1	4	2	2	-[b]	-6.70
Transportation, Communication, and Utilities	0	6	14	12	12	-[b]	-1.53
Wholesale and Retail Trade	0	27	67	46	47	-[b]	-3.48
Finance, Insurance, and Real Estate	0	3	8	5	6	-[b]	-2.84
Services	0	13	34	24	25	-[b]	-3.12
Government	0	30	71	57	61	-[b]	-1.51
Nonfarm Proprietors	0	23	54	40	42	-[b]	-2.48
Total	0	202	290	219	229	-[b]	-2.33

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Garfield County

The change in employment caused by the low commercial development scenario in Garfield County would be the smallest in the region. Employment would grow from zero workers in 1985 to 52 in 2005, with most of this increase occurring by 1995 (see Table 4.46). The mining sector would account for 30 additional workers in 1995, 2000, and 2005, and the contract construction sector would account for 10 additional workers in 1990. No other sector would have more than six more workers in any window year.

Grand County

In Grand County, the low commercial development scenario is expected to produce the second largest changes in employment in the region. Employment would be 20 times greater in 1990 than in 1985. Between 1990 and 2005, employment would decline 2.62% annually, totaling 1,044 workers in 2005.

Table 4.46 Changes in Garfield County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	_[b]	_[b]
Mining	0	0	30	30	30	_[b]	0
Contract Construction	0	10	1	1	1	_[b]	0
Manufacturing	0	0	0	0	0	_[b]	_[b]
Transportation, Communication, and Utilities	0	0	1	1	1	_[b]	0
Wholesale and Retail Trade	0	1	5	5	5	_[b]	0
Finance, Insurance, and Real Estate	0	0	1	1	1	_[b]	0
Services	0	1	3	3	3	_[b]	0
Government	0	1	5	6	6	_[b]	1.84
Nonfarm Proprietors	0	1	3	4	4	_[b]	2.92
Total	0	14	49	51	52	_[b]	0.60

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Over 60% of the employment in the county in 1985 and 1995 would be in the contract construction sector. Table 4.47 indicates that the mining sector would be the largest in 1995, 2000, and 2005, accounting for over half of total employment. The government sector would grow most rapidly between 1985 and 1995, increasing at an annual rate of 39.04%. Mining and government would be the only sectors to increase between 1995 and 2005.

Uintah County

In Uintah County, the low commercial development scenario would produce employment for 123 additional workers in 1985, the highest total in the region in that year. Employment would grow 12.03% annually from 1985 to 1995 -- the smallest growth in the region -- and 0.56% annually from 1995 to 2005. Contract construction would account for 102 of the workers in 1985, while mining would be the largest sector with 280 workers between 1990 and 2005. Other sectors would have less than 50 workers each. The most rapid percentage

Table 4.47 Changes in Grand County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	181	471	581	581	-[b]	2.12
Contract Construction	51	825	429	26	27	23.73	-24.16
Manufacturing	0	6	8	7	7	-[b]	-1.33
Transportation, Communication, and Utilities	1	16	19	17	17	34.23	-1.11
Wholesale and Retail Trade	5	105	124	108	112	37.86	-1.01
Finance, Insurance, and Real Estate	1	14	17	15	15	32.75	-1.24
Services	3	56	70	62	65	37.02	-0.74
Government	5	108	135	129	139	39.04	0.29
Nonfarm Proprietors	4	75	88	77	80	36.22	-0.95
Total	69	1,385	1,361	1,023	1,044	34.74	-2.62

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

growth between 1985 and 1995 would be in the government sector. Between 1995 and 2005 the most rapid percentage growth would be in the finance, insurance, and real estate sector (see Table 4.48).

Wayne County

The employment generated by the low commercial development scenario would increase from zero workers in 1985 to 376 workers in 2005. This growth would be the most rapid in the region from 1990 to 1995, but employment would decrease 7.16% annually between 1995 and 2005. Table 4.49 shows that one sector would dominate the new employment opportunities projected for the county in each year. In 1990 and 1995, contract construction would have at least 65% of the total employment. In 2000 and 2005, mining would have 65% of the total employment. Mining would be the only sector to increase between 1995 and 2005.

Table 4.48 Changes in Uintah County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	280	280	280	280	-[b]	0
Contract Construction	102	6	7	8	9	-23.50	2.54
Manufacturing	0	1	1	1	1	-[b]	0
Transportation, Communication, and Utilities	1	4	4	5	5	14.87	2.26
Wholesale and Retail Trade	6	18	21	24	25	13.35	1.76
Finance, Insurance, and Real Estate	1	2	3	3	4	11.61	2.92
Services	5	17	20	23	24	14.87	1.84
Government	8	28	37	47	49	16.55	2.85
Nonfarm Proprietors	2	7	9	10	10	16.23	1.06
Total	123	363	383	403	405	12.03	0.56

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Personal Income Impact Projections

The total personal income projections by county are presented in Table 4.50. These projections are based upon a forecast of per capita income and population growth. Per capita income for the years 1985-2005 was derived by aggregating the average monthly wage levels by industrial sector and assuming that (1) the personal income component would remain at the same proportion as the national level and (2) the average annual rate of growth would remain constant. See Appendix A for a detailed description of the methodology.

The per capita income levels for the region are shown in the first line of Table 4.50. Per capita income is projected to increase from $14,448 in 1985 to $15,132 in 1995 but then decrease to $14,364 in 2005. The annual rate of increase in the first 10 years would be 0.46% with a -0.52% decline in the final 10 years. A description of county trends follows.

Total personal income in Carbon County is projected to grow from $1.1 million in 1985 to $131.24 million in 2005. The annual increase of 2.65%

Table 4.49 Changes in Wayne County Employment Resulting from the Low Commercial Development Scenario[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	-[b]	-[b]
Mining	0	0	120	240	240	-[b]	7.18
Contract Construction	0	102	511	8	8	-[b]	-34.01
Manufacturing	0	0	3	2	2	-[b]	-3.97
Transportation, Communication, and Utilities	0	1	8	6	6	-[b]	-2.84
Wholesale and Retail Trade	0	6	44	32	33	-[b]	-2.84
Finance, Insurance, and Real Estate	0	1	7	5	5	-[b]	-3.31
Services	0	4	25	19	20	-[b]	-2.21
Government	0	6	42	34	37	-[b]	-1.26
Nonfarm Proprietors	0	5	31	23	24	-[b]	-2.53
Total	0	124	790	370	376	-[b]	-7.16

[a]Totals may not add due to rounding.

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

between 1995 and 2005 would be the largest in the region. From 1990 through 2005 the additional personal income projected for the county would be the largest in the region.

In Duchesne County, total personal income would grow from $1.4 million in 1985 to $6.2 million in 2005 due to the low commercial development scenario. Most of this increase would occur from 1985 to 1995, with 1% annual increases in the following 10 years. Duchesne County would have the second highest level of additional personal income in the region in 1985, but by 2005, only one other county would have a smaller level of total personal income.

Total personal income in Emery County (from the low commercial scenario projects) is forecast to grow from $0.2 million in 1985 to $17.1 million in 2005. After increasing at an annual rate of 65.49% between 1985 and 1995 to a peak of $26.2 million, total personal income would decrease 4.15% annually through 2005. The rate of increase from 1985 to 1995 and the rate of

Table 4.50 Total Personal Income and Per Capita Income Projections by County - Low Commercial Development Scenario

County Population and Income Category	Income and Population, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Per Capita Income (1980 $)	14,448	15,816	15,132	13,416	14,364	0.46	-0.52
Change from Baseline, Carbon County							
Population	76	2,895	6,677	8,811	9,137	56.45	3.19
Total Personal Income (1980 $ x 10^6)	1.10	45.79	101.04	118.21	131.24	57.15	2.65
Change from Baseline, Duchesne County							
Population	97	311	372	423	433	14.39	1.53
Total Personal Income (1980 $ x 10^6)	1.40	4.92	5.63	5.67	6.22	14.93	1.00
Change from Baseline, Emery County							
Population	12	747	1,731	1,151	1,193	64.40	-3.65
Total Personal Income (1980 $ x 10^6)	0.17	11.81	26.19	15.44	17.14	65.49	-4.15
Change from Baseline, Garfield County							
Population	0	29	114	124	129	-[a]	1.24
Total Personal Income (1980 $ x 10^6)	0	0.46	1.73	1.67	1.85	-[a]	-0.67
Change from Baseline, Grand County							
Population	125	2,559	2,878	2,477	2,569	36.84	-1.13
Total Personal Income (1980 $ x 10^6)	1.81	40.47	43.55	33.23	36.90	37.45	-1.64
Change from Baseline, Uintah County							
Population	164	588	689	771	787	15.44	1.34
Total Personal Income (1980 $ x 10^6)	2.37	9.30	10.43	10.34	11.30	15.97	-0.80
Change from Baseline, Wayne County							
Population	0	159	1,076	758	786	-[a]	-3.09
Total Personal Income (1980 $ x 10^6)	0	2.51	16.28	10.17	11.29	-[a]	-3.59

[a]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

decrease from 1995 to 2005 in Emery County personal income would each be the greatest in the region.

Garfield County is projected to have total personal income increase from the baseline level in 1985 to $1.85 million more than the baseline in 2005. Throughout the 20 year period, total personal income in the county would be the smallest in the region.

Total personal income in Grand County (from the low commercial scenario projects) would reach a peak of $43.6 million in 1995 and drop to $36.9 million in 2005. The total personal income of $1.81 million in 1985 would be the greatest in the region. After 1985, the county would have the second highest level of total personal income in the region.

As a result of the low scenario, total personal income in Uintah County would grow from $2.4 million in 1985 to $11.3 million in 2005. Most of this growth would occur between 1985 and 1990, with only slight growth thereafter.

Total personal income in Wayne County is forecast to grow from zero in 1985 to a peak of $16.3 million in 1995. After 1995, total personal income would decrease 3.59% annually to $11.3 million in 2005.

4.2.2.3 Public and Private Infrastructure Effects

The projected effects of the low commercial development scenario on the public and private infrastructure in the region are described in this section. The rate of change in infrastructure demands is described first, followed by a discussion of the magnitude of the impacts. Housing, education, health care, public safety, and utility services are included in the analysis.

Rate of Change in Infrastructure Demands

Table 4.51 identifies the growth in the projected infrastructure demands resulting from the low commercial development scenario between 1985 and 2005. The change is expressed as a cumulative growth factor rather than percent change because, in many instances, the demand in 2005 would be many times greater than the demand in 1985. The projected demand for housing created by the low scenario is presented in more detail in Appendix C, Table C.2, which includes CCD and community data.

Carbon County is projected to have the greatest increase in housing demand in the region. The demand for single-family units would be 90 times greater in 2005 than in 1985, the demand for multifamily units would be 76 times greater, and the demand for mobile homes would be 91 times greater. The East Carbon and Price CCDs would grow more than twice as rapidly as the Helper CCD. Of the 1,523 additional single-family units in the county in 2005, 990 would be in the Price CCD, 453 would be in the East Carbon CCD, and 81 would

Table 4.51 Infrastructure Service Demand Growth Factors Precipitated by the Development of the Low Commercial Scenario Tar Sands Projects

Infrastructure Category	Cumulative Growth Factors, 1985-2005[a]				
	Carbon County	Duchesne County	Emery County	Grand County	Uintah County
Housing					
Single family units	90	3	66	15	4
Multifamily units	76	3	50	15	4
Mobile homes	91	3	83	15	4
Education					
Students	186	8	183	33	8
Classrooms	112	6	15	32	6
Teachers	112	6	15	32	6
Health Care					
Hospital beds					
General care	19	1	3	6	2
Long-term care	_[b]	_[b]	_[b]	_[b]	_[b]
Medical personnel					
Doctors	6	1	1	2	1
Dentists	5	1	1	2	1
Nurses	16	1	3	5	2
Public health nurses	2	1	1	1	1
Mental health care					
Clinical psychologists	1	1	1	1	1
Mental health workers	1	1	1	1	1
Public Safety					
Law enforcement					
Police officers	19	1	3	6	2
Patrol cars	19	1	3	6	2
Jail floor space	120	4	100	20	5
Juvenile holding cells	2	1	1	1	1
Emergency Medical Service					
Ambulances	2	1	1	1	1
Emergency medical technicians	2	1	1	1	1
Utility Service Demands					
Water system					
Connections	118	4	96	20	5
Supply capacity	115	4	113	20	5
Storage capacity	123	5	112	20	5
Treatment capacity	115	4	113	20	5
Sewage system capacity	111	4	44	19	5
Other Services					
Park land area	55	3	8	16	5
Libraries					
Books	120	4	99	21	5
Floor space	120	4	100	20	5

[a]Growth factors for Garfield and Wayne counties were undefined.

[b]Undefined.

be in the Helper CCD. The city of Price would have the largest increases, followed by East Carbon. The most rapid rate of increases would occur in East Carbon and Wellington.

In Duchesne County, housing demand would increase over 200% between 1985 and 2005. Most of this growth would take place from 1985 to 1995. Almost all of the housing demand would be in the Roosevelt CCD. For single-family units in 2005, the demand in the Roosevelt CCD would be 71 while the demand in the Duchesne CCD would be two. In the Roosevelt CCD, most of the demand would occur in Roosevelt or the unincorporated areas with minor changes in Myton. All of the housing demand in the Duchesne CCD would be in the city of Duchesne.

The additional housing demand in Emery County created by the low commercial development scenario would grow between 1985 and 2005 by factors ranging from 50 to 83. Most of the growth would occur in the Castle Dale-Huntington CCD. The demand for single-family units in the Castle Dale-Huntington CCD would increase from two in 1985 to 118 in 2005. Castle Dale, Huntington, and Orangeville would have the largest demands in the CCD. Housing demand, especially for single-family units, would also substantially increase in the Green River CCD. Little additional demand for housing is projected to take place in the Emery-Ferron CCD.

All of the housing demand in Garfield County would occur in the Escalante CCD. While housing demand would remain at baseline levels in 1985, an additional 22 single-family units, 6 multifamily units, and 9 mobile homes would be needed in 2005. Escalante would experience most of the increased demand, with Boulder needing three single-family units and one multifamily unit and one mobile home in 1995 through 2005.

Grand County is projected to have the second largest housing demand in the region between 1990 and 2005. Single-family units would increase from 28 in 1985 to 429 in 2005. Over 45% of the housing demand in the county during the 20 year period would be in the Thompson CCD.

Housing demand in Uintah County would increase 267% as a result of the low scenario. This demand would be split between the Uintah Ouray CCD and the Vernal CCD. Single-family units in the Uintah Ouray CCD would increase from 12 in 1985 to 67 in 2005, with about two-thirds of this growth occurring in the unincorporated area and one-third in Ballard. The demand for single-family units in the Vernal CCD is projected to grow from 26 in 1985 to 65 in 2005, divided evenly between Vernal and the unincorporated areas of the CCD.

In Wayne County, housing demand for single-family units would grow from zero in 1985 to 131 in 2005. The demand would decline after reaching a peak in 1995. All of the housing demand produced by the low commercial development scenario would occur in the Hanksville CCD.

Education would grow more rapidly than any other infrastructure category. The number of students would increase by as much as 186 times in Carbon County and 183 times in Emery County between 1985 and 2005. The demand for classrooms and teachers would increase by at least 500% in each county during the same period.

Health care services would grow at a markedly slower rate. Only in Carbon and Grand counties would the demand for hospital beds and medical personnel increase by more than a factor of three between 1985 and 2005. The number of mental health workers needed in 2005 would be twice as great as the number needed in 1985 in five counties.

The demand for public safety services created by the low scenario would differ depending on the service. Jail space would need to expand 100 times or more in Carbon and Emery counties between 1985 and 2005. In the same period, the number of police officers and patrol cars would double in Duchesne County and be 19 times greater in Carbon County. There would be little change in the demand for juvenile holding cells, ambulances, and emergency medical technicians.

The growth in the demand for utility services would be comparable to the growth in the demand for educational services. Water system and sewage system needs would range from 19 times to 123 times in 2005 than in 1985 in Carbon, Emery, and Grand counties. The same is true of the demand for library services attributable to the low commercial development scenario. Park service demands would be at least 200% greater in 2005 than in 1985 in each county in the region.

Magnitude of Impact Caused by Low Commercial Scenario Development Infrastructure Demands

Summaries of the changes in the infrastructure service demands resulting from the low commercial scenario are presented in Tables 4.52 through 4.58. In Carbon County, the low scenario would account for no more than 50% of the total demand (baseline and scenario) for any service throughout the 20 year period (Table 4.52). About 1% of the new demand for housing, education, utility, and library services in 1985 would be generated by the low commercial development scenario. In 2005, half of the clinical psychologists and juvenile holding cells and 22% of the long-term care hospital beds would be needed as a result of the low scenario. For all other services, between 33% and 39% of the demand would be attributed to the low commercial scenario projects.

Less than 10% of the additional demand for housing, education, utility, library, and selected health and public safety services in Duchesne County would be the result of the low commercial development scenario. About 2% of housing, education, utility, and library services in 1985 and 8% of those services in 2005 would be required because of the low scenario. Table 4.53 shows that half of the demand for the mental health care services and juvenile

Table 4.52 Summary of the Changes in Carbon County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,290	17	1.3	2,126	621	22.6	2,396	1,305	35.3	2,528	1,473	36.8	2,636	1,523	36.6
Multifamily	323	5	1.5	532	156	22.7	599	327	35.3	632	369	36.9	659	381	36.6
Mobile homes	538	7	1.3	886	259	22.6	998	544	35.3	1,053	614	36.8	1,098	635	36.6
Education															
Students	1,924	15	0.8	3,824	612	13.8	4,824	1,649	25.5	4,624	2,541	35.5	4,724	2,792	37.1
Classrooms	77	1	1.3	153	25	14.0	193	66	25.5	185	102	35.5	189	112	37.2
Teachers	77	1	1.3	153	25	14.0	193	66	25.5	185	102	35.5	189	112	37.2
Health Care															
Hospital beds															
General care	15	1	6.3	25	6	19.4	29	14	32.6	30	18	37.5	31	19	38.0
Long-term care	23	0	0	39	3	7.1	39	6	13.3	39	12	23.5	43	12	21.8
Medical personnel															
Doctors	5	1	16.7	8	2	20.0	9	5	35.7	9	6	40.0	10	6	37.5
Dentists	4	1	20.0	7	2	22.2	8	4	33.3	8	5	38.4	8	5	38.5
Nurses	13	1	7.1	21	5	19.2	25	12	32.4	25	15	37.5	26	16	38.1
Public health nurses	2	1	33.3	3	1	25.0	3	2	40.0	3	2	40.0	4	2	33.3
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Public Safety															
Law enforcement															
Police officers	15	1	6.3	25	6	19.4	29	14	32.6	30	18	37.5	31	19	38.0
Patrol cars	15	1	6.3	25	6	19.4	29	14	32.6	30	18	37.5	31	19	38.0
Jail space (sq ft)	3,703	38	1.0	6,161	1,448	19.0	7,161	3,339	31.8	7,306	4,406	37.6	7,551	4,569	37.7
Juvenile holding cells	1	1	50.0	2	1	33.3	2	1	33.3	2	2	50.0	2	2	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	3,000/ 10	1,000/ 4	25.0	3,000/ 10	1,750/ 7	36.8	3,000/ 10	2,500/ 10	45.5	3,000/ 10	3,000/ 10	50.0	3,000/ 10	3,000/ 10	50.0
Emergency Medical Service															
Ambulances	2	1	33.3	3	1	25.0	3	2	40.0	3	2	40.0	4	2	33.3
Emergency medical technicians	14	7	33.3	21	7	25.0	21	14	40.0	21	14	40.0	28	14	33.3
Utility Service Demands															
Water system															
Connections	2,390	25	1.0	3,975	934	19.0	4,620	2,155	31.8	4,714	2,843	37.6	4,872	2,948	37.7
Supply (10^6 gal/d)	3.8	0.1	2.6	6.4	1.5	19.0	7.4	3.4	31.5	7.5	4.5	37.5	7.8	4.7	37.6
Storage (10^6 gal/d)	1.9	0.1	5.0	3.2	0.7	17.9	3.7	1.7	31.5	3.8	2.3	37.7	3.9	2.4	38.1
Treatment (10^6 gal/d)	3.8	0.1	2.6	6.4	1.5	19.0	7.4	3.4	31.5	7.5	4.5	37.5	7.8	4.7	37.6
Sewage system (10^6 gal/d)	0.7	0.1	12.5	1.2	0.3	20.0	1.4	0.7	33.3	1.5	0.9	37.5	1.5	0.9	37.5
Other Services															
Parks (acres)	45	1	2.2	74	18	19.6	86	41	32.3	88	53	37.6	91	55	37.7
Libraries															
Books	14,812	152	1.0	24,642	5,790	19.0	28,642	13,354	31.8	29,222	17,622	37.6	30,202	18,274	37.7
Space (sq ft)	3,703	38	1.0	6,161	1,448	19.0	7,161	3,339	31.8	7,306	4,406	37.6	7,551	4,569	37.7

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.53 Summary of the Changes in Duchesne County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,007	22	2.1	1,072	59	5.2	1,055	62	5.6	1,088	69	6.0	1,139	73	6.0
Multifamily	252	6	2.3	268	15	5.3	264	16	5.7	273	18	6.2	285	19	6.3
Mobile homes	420	9	2.1	447	25	5.3	439	26	5.6	454	29	6.0	475	31	6.1
Education															
Students	1,254	18	1.4	1,924	59	3.0	2,244	93	4.0	1,824	132	6.7	1,724	140	7.5
Classrooms	51	1	1.9	77	3	3.8	90	4	4.3	73	6	7.6	69	6	8.0
Teachers	51	1	1.9	77	3	3.8	90	4	4.3	73	6	7.6	69	6	8.0
Health Care															
Hospital beds															
General care	11	1	8.3	13	1	7.1	13	1	7.1	12	1	7.7	11	1	8.3
Long-term care	6	0	0	9	1	10.0	14	1	6.7	18	1	5.3	24	1	4.0
Medical personnel															
Doctors	4	1	20.0	4	1	20.0	4	1	20.0	4	1	20.0	4	1	20.0
Dentists	3	1	25.0	4	1	20.0	4	1	20.0	3	1	25.0	3	1	25.0
Nurses	9	1	10.0	11	1	8.3	11	1	8.3	10	1	9.1	10	1	9.1
Public health nurses	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	11	1	8.3	13	1	7.1	13	1	7.1	12	1	7.7	11	1	8.3
Patrol cars	11	1	8.3	13	1	7.1	13	1	7.1	12	1	7.7	11	1	8.3
Jail space (sq ft)	2,608	49	1.8	3,033	156	4.9	3,058	186	5.7	2,863	212	6.9	2,703	217	7.4
Juvenile holding cells	1	1	50.0	1	1	50.0	1	1	50.0		1	50.0	1	1	50.0
Fire protection															
Water flow (gpm)/ duration (hr)	2,500/ 10	1,000/ 4	28.6	3,000/ 10	1,000/ 10	25.0	3,000/ 10	1,000/ 4	25.0	2,500/ 10	1,000/ 4	28.6	2,500/ 10	1,000/ 4	28.6
Emergency Medical Service															
Ambulances	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Emergency medical technicians	14	7	33.3	14	7	33.3	14	7	33.3	14	7	33.3	14	7	33.3
Utility Service Demands															
Water system															
Connections	1,683	32	1.9	1,957	101	4.9	1,973	121	5.8	1,847	137	6.9	1,744	140	7.4
Supply (10^6 gal/d)	2.7	0.1	3.6	3.1	0.2	6.1	3.2	0.2	5.9	3.0	0.2	6.3	2.8	0.2	6.7
Storage (10^6 gal/d)	1.3	0.1	7.1	1.6	0.1	5.9	1.6	0.1	5.9	1.5	0.1	6.3	1.4	0.1	6.7
Treatment (10^6 gal/d)	2.7	0.1	3.6	3.1	0.2	6.1	3.2	0.1	5.9	3.0	0.2	6.3	2.8	0.2	6.7
Sewage system (10^6 gal/d)	0.5	0.1	16.7	0.6	0.1	14.3	0.6	0.1	14.3	0.6	0.1	14.3	0.5	0.1	16.7
Other Services															
Parks (acres)	32	1	3.0	37	2	5.0	37	3	7.5	35	3	7.9	33	3	8.3
Libraries															
Books	10,430	194	1.8	12,130	622	4.9	12,230	744	5.7	11,450	846	6.9	10,810	866	7.4
Space (sq ft)	2,608	49	1.8	3,033	156	4.9	3,058	186	5.7	2,863	212	6.9	2,703	217	7.4

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.54 Summary of the Changes in Emery County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	382	3	0.8	448	161	26.4	472	339	41.8	448	193	30.1	412	199	32.6
Multifamily	96	1	1.0	112	41	26.8	118	85	41.9	112	49	30.4	103	50	32.7
Mobile homes	159	1	0.6	187	67	26.4	197	141	41.7	187	81	30.2	172	83	32.5
Education															
Students	816	2	0.2	1,416	158	10.0	1,716	428	20.0	1,516	332	18.0	1,516	365	19.4
Classrooms	33	1	2.9	57	7	10.9	69	18	20.7	61	14	18.7	61	15	19.7
Teachers	33	1	2.9	57	7	10.9	69	18	20.7	61	14	18.7	61	15	19.7
Health Care															
Hospital beds															
General care	6	1	14.3	7	2	22.2	8	4	33.3	7	3	30.0	7	3	30.0
Long-term care	6	0	0	6	1	14.3	6	2	25.0	4	2	33.3	4	2	33.3
Medical personnel															
Doctors	2	1	33.3	3	1	25.0	3	2	40.0	2	1	33.3	2	1	33.3
Dentists	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Nurses	5	1	16.7	6	2	25.0	7	3	30.0	6	2	25.0	6	3	33.3
Public health nurses	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	6	1	14.3	7	2	22.2	8	4	33.3	7	3	30.0	7	3	30.0
Patrol cars	6	1	14.3	7	2	22.2	8	4	33.3	7	3	30.0	7	3	30.0
Jail space (sq ft)	1,305	6	0.5	1,695	374	18.1	1,815	866	32.3	1,640	576	26.0	1,550	597	27.8
Juvenile holding cells	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	1,750/ 7	1,000/ 4	36.4	2,000/ 8	1,000/ 4	33.3	2,000/ 8	1,250/ 5	38.5	2,000/ 8	1,000/ 4	33.3	2,000/ 8	1,000/ 4	33.3
Emergency Medical Service															
Ambulances	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Emergency medical technicians	7	7	50.0	7	7	50.0	7	7	50.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	842	4	0.5	1,094	241	18.1	1,171	559	32.3	1,058	372	26.0	1,000	385	27.8
Supply (10^6 gal/d)	1.3	0.1	7.1	1.8	0.4	18.2	1.9	0.9	32.1	1.7	0.6	26.1	1.6	0.6	27.2
Storage (10^6 gal/d)	0.7	0.1	12.5	0.9	0.2	18.2	0.9	0.4	30.8	0.8	0.3	27.3	0.8	0.3	27.3
Treatment (10^6 gal/d)	1.3	0.1	7.1	1.8	0.4	18.2	1.9	0.9	32.1	1.7	0.6	26.1	1.6	0.6	27.2
Sewage system (10^6 gal/d)	0.3	0.1	33.3	0.3	0.1	25.0	0.4	0.2	33.3	0.3	0.1	25.0	0.3	0.1	25.0
Other Services															
Parks (acres)	16	1	5.9	21	5	7.7	22	11	33.3	20	7	25.9	19	8	29.6
Libraries															
Books	5,218	24	0.5	6,778	1,494	18.1	7,258	3,462	32.3	6,558	2,302	26.0	6,198	2,386	27.8
Space (sq ft)	1,305	6	0.5	1,695	374	18.1	1,815	866	32.3	1,640	576	26.0	1,550	597	27.8

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.55 Summary of the Changes in Garfield County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	139	0	0	199	6	2.9	241	23	8.7	277	21	7.0	319	22	6.5
Multifamily	35	0	0	50	2	3.8	61	6	9.0	70	6	7.9	80	6	7.0
Mobile homes	58	0	0	83	3	3.5	101	10	9.0	116	9	7.2	133	9	6.3
Education															
Students	128	0	0	328	6	1.8	428	28	6.1	528	36	6.4	628	39	5.8
Classrooms	6	0	0	14	1	6.7	18	2	10.0	22	2	8.3	26	2	7.1
Teachers	6	0	0	14	1	6.7	18	2	10.0	22	2	8.3	26	2	7.1
Health Care															
Hospital beds															
General care	2	0	0	2	1	33.3	3	1	25.0	3	1	25.0	4	1	20.0
Long-term care	3	0	0	3	1	25.0	3	1	25.0	1	1	50.0	2	1	33.3
Medical personnel															
Doctors	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1		50.0
Dentists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Nurses	2	0	0	2	1	33.3	2	1	33.3	3	1	25.0	3	1	25.0
Public health nurses	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	2	0	0	2	1	33.3	3	1	25.0	3	1	25.0	4	1	20.0
Patrol cars	2	0	0	2	1	33.3	3	1	25.0	3	1	25.0	4	1	20.0
Jail space (sq ft)	314	0	0	464	15	3.1	564	57	9.2	664	62	8.5	764	65	7.8
Juvenile holding cells	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	1,000/ 4	0/0	0	1,000/ 4	1,000/ 4	50.0	1,250/ 5	1,000/ 4	44.4	1,250/ 5	1,000/ 4	44.4	1,500/ 6	1,000/ 4	40.0
Emergency Medical Service															
Ambulances	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Emergency medical technicians	7	0	0	7	7	50.0	7	7	50.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	203	0	0	300	10	3.2	364	37	9.2	429	41	8.7	493	42	7.9
Supply (10^6 gal/d)	0.3	0	0	0.5	0.1	16.7	0.6	0.1	14.3	0.7	0.1	12.5	0.8	0.1	11.1
Storage (10^6 gal/d)	0.2	0	0	0.2	0.1	33.3	0.3	0.1	25.0	0.3	0.1	25.0	0.4	0.1	20.0
Treatment (10^6 gal/d)	0.3	0	0	0.5	0.1	16.7	0.6	0.1	14.3	0.7	0.1	12.5	0.8	0.1	11.1
Sewage system (10^6 gal/d)	0.1	0	0	0.1	0.1	50.0	0.1	0.1	50.0	0.1	0.1	50.0	0.2	0.1	33.3
Other Services															
Parks (acres)	4	0	0	6	1	14.3	7	1	12.5	8	1	11.1	10	1	9.1
Libraries															
Books	1,254	0	0	1,854	58	3.0	2,254	228	9.2	2,654	248	8.5	3,054	258	7.8
Space (sq ft)	314	0	0	464	15	3.1	564	57	9.2	664	62	8.5	764	65	7.8

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.56 Summary of the Changes in Grand County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	-95	28	-[c]	11	549	98.0	47	563	92.3	11	414	97.4	59	429	87.9
Multifamily	-23	7	-[c]	3	138	97.9	12	141	92.2	3	104	97.2	15	108	87.8
Mobile homes	-39	12	-[c]	5	229	97.9	20	235	92.2	5	173	97.2	25	179	87.7
Education															
Students	99	24	19.5	479	541	53.0	599	711	54.3	479	714	59.8	529	785	59.7
Classrooms	4	1	20.0	20	22	52.4	24	29	54.7	20	29	59.2	22	32	59.3
Teachers	4	1	20.0	20	22	52.4	24	29	54.7	20	29	59.2	22	32	59.3
Health Care															
Hospital beds															
General care	0	1	100.0	1	6	85.7	1	6	85.7	1	5	83.3	1	6	85.7
Long-term care	2	0	0	2	2	50.0	2	3	60.0	2	4	66.7	2	4	66.7
Medical personnel															
Doctors	0	1	100.0	1	2	66.7	1	2	66.7	1	2	66.7	1	2	66.7
Dentists	0	1	100.0	1	2	66.7	1	2	66.7	1	2	66.7	1	2	66.7
Nurses	0	1	100.0	1	5	83.3	1	5	83.3	1	5	83.3	1	5	83.3
Public health nurses	0	1	100.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	0	1	100.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	0	1	100.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	0	1	100.0	1	6	85.7	1	6	85.7	1	5	83.3	1	6	85.7
Patrol cars	0	1	100.0	1	6	85.7	1	6	85.7	1	5	83.3	1	6	85.7
Jail space (sq ft)	-220	63	-[c]	5	1,280	99.6	110	1,439	92.9	45	1,239	96.5	130	1,285	90.8
Juvenile holding cells	0	1	100.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	0/0	1,000/ 4	100.0	1,000/ 4	1,750/ 7	63.6	1,000/ 4	1,750/ 7	63.6	1,000/ 4	1,500/ 6	60.0	1,000/ 4	1,750/ 7	63.6
Emergency Medical Service															
Ambulances	0	1	100.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Emergency medical technicians	0	7	100.0	7	7	50.0	7	7	50.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	-142	41	-[c]	3	826	99.6	71	929	92.9	29	800	96.5	84	829	90.9
Supply (10^6 gal/d)	-0.2	0.1	-[c]	0.1	1.3	92.9	0.1	1.5	93.8	0.1	1.3	92.9	0.1	1.3	92.9
Storage (10^6 gal/d)	-0.1	0.1	-[c]	0.1	0.7	87.5	0.1	0.7	87.5	0.1	0.6	85.7	0.1	0.7	87.5
Treatment (10^6 gal/d)	-0.2	0.1	-[c]	0.1	1.3	92.9	0.1	1.5	93.8	0.1	1.3	92.9	0.1	1.3	92.9
Sewage system (10^6 gal/d)	-0.1	0.1	-[c]	0.1	0.3	75.0	0.1	0.3	75.0	0.1	0.2	66.7	0.1	0.3	75.0
Other Services															
Parks (acres)	-2	1	-[c]	1	16	94.1	2	18	90.0	1	15	93.8	2	16	88.9
Libraries															
Books	-882	250	-[c]	18	5,118	99.6	438	5,756	92.9	178	4,954	96.5	518	5,138	90.8
Space (sq ft)	-220	63	-[c]	5	1,280	99.6	110	1,439	92.9	45	1,239	96.5	130	1,285	90.8

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

[c]Undefined.

Table 4.57 Summary of the Changes in Uintah County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,014	36	3.4	1,512	111	6.8	1,560	114	6.8	1,566	126	7.4	1,608	132	7.6
Multifamily	254	9	3.4	378	28	6.9	390	29	6.9	392	32	7.5	402	33	7.6
Mobile homes	423	15	3.4	630	47	6.9	650	48	6.9	653	53	7.5	670	55	7.6
Education															
Students	1,400	31	2.2	3,010	12	3.6	3,770	172	4.4	3,020	241	7.4	2,790	254	8.3
Classrooms	56	2	3.4	121	5	4.0	151	7	4.4	121	10	7.6	112	11	8.9
Teachers	56	2	3.4	121	5	4.0	151	7	4.4	121	10	7.6	112	11	8.9
Health Care															
Hospital beds															
General care	11	1	8.3	18	2	10.0	19	2	9.5	17	2	10.5	16	2	11.1
Long-term care	10	0	0	21	1	4.5	29	1	3.3	35	1	2.8	42	1	2.3
Medical personnel															
Doctors	4	1	20.0	6	1	14.3	6	1	14.3	6	1	14.3	5	1	16.7
Dentists	3	1	25.0	5	1	16.7	5	1	16.7	5	1	16.7	4	1	20.0
Nurses	9	1	10.0	15	1	6.3	16	2	11.1	15	2	11.8	14	2	12.5
Public health nurses	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	11	1	8.3	18	1	5.3	19	1	5.0	17	2	10.5	16	2	11.1
Patrol cars	11	1	8.3	18	1	5.3	19	1	5.0	17	2	10.5	16	2	11.1
Jail space (sq ft)	2,602	82	3.1	4,402	294	6.3	4,672	345	6.9	4,232	386	8.4	3,842	394	9.3
Juvenile holding cells	1	1	50.0	2	1	33.3	2	1	33.3	2	1	33.3	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	2,500/ 10	1,000/ 4	28.6	3,000/ 10	1,000/ 4	25.0	3,000/ 10	1,000/ 4	25.0	3,000/ 10	1,000/ 4	25.0	3,000/ 10	1,000/ 4	25.0
Emergency Medical Service															
Ambulances	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3	2	1	33.3
Emergency medical technicians	14	7	33.3	14	7	33.3	14	7	33.3	14	7	33.3	14	7	33.3
Utility Service Demands															
Water system															
Connections	1,679	53	3.1	2,841	190	6.3	3,015	223	6.9	2,731	249	8.4	2,479	254	9.3
Supply (10^6 gal/d)	2.7	0.1	3.6	4.5	0.3	6.3	4.8	0.4	7.7	4.4	0.4	8.3	4.0	0.4	9.1
Storage (10^6 gal/d)	1.3	0.1	7.1	2.3	0.2	8.0	2.4	0.2	7.7	2.2	0.2	8.3	2.0	0.2	9.1
Treatment (10^6 gal/d)	2.7	0.1	3.6	4.5	0.3	6.3	4.8	0.4	7.7	4.4	0.4	8.3	4.0	0.4	9.1
Sewage system (10^6 gal/d)	0.5	0.1	16.7	0.9	0.1	10.0	0.9	0.1	10.0	0.8	0.1	11.1	0.8	0.1	11.1
Other Services															
Parks (acres)	32	1	3.0	53	4	7.0	57	5	8.1	5.1	5	8.9	47	5	9.6
Libraries															
Books	10,408	328	3.1	17,608	1,176	6.3	18,688	1,378	6.9	16,928	1,542	8.3	15,368	1,574	9.3
Space (sq ft)	2,602	82	3.1	4,402	294	6.3	4,672	345	6.9	4,232	386	8.4	3,842	394	9.3

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 4.58 Summary of the Changes in Wayne County Infrastructure Service Demands Resulting from the Low Commercial Development Scenario[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario		Projected Baseline Demand Increment[b]	Low Scenario	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	38	0	0	80	35	30.4	122	210	63.3	164	127	43.6	194	131	40.3
Multifamily	10	0	0	20	9	31.0	31	53	63.1	41	32	43.8	49	33	40.2
Mobile homes	16	0	0	33	15	31.3	51	88	63.3	68	53	43.8	81	55	40.4
Education															
Students	48	0	0	98	34	25.8	158	266	62.7	198	219	52.5	238	240	50.2
Classrooms	2	0	0	4	2	33.3	7	11	61.1	8	9	52.9	10	10	50.0
Teachers	2	0	0	4	2	33.3	7	11	61.1	8	9	52.9	10	10	50.0
Health Care															
Hospital beds															
General care	1	0	0	1	1	50.0	2	3	60.0	2	2	50.0	3	2	40.0
Long-term care	2	0	0	3	1	25.0	4	1	20.0	5	1	16.7	6	1	14.3
Medical personnel															
Doctors	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Dentists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Nurses	1	0	0	1	1	50.0	2	2	50.0	2	2	50.0	2	2	50.0
Public health nurses	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Public Safety															
Law enforcement															
Police officers	1	0	0	1	1	50.0	2	3	60.0	2	2	50.0	3	2	40.0
Patrol cars	1	0	0	1	1	50.0	2	3	60.0	2	2	50.0	3	2	40.0
Jail space (sq ft)	105	0	0	215	80	27.1	330	538	62.0	420	379	47.4	510	393	43.5
Juvenile holding cells	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	1,000/ 4	0/0	0	1,000/ 4	1,000/ 4	50.0	1,000/ 4	1,000/ 4	50.0	1,000/ 4	1,000/ 4	50.0	1,250/ 5	1,000/ 4	44.4
Emergency Medical Service															
Ambulances	1	0	0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Emergency medical technicians	7	0	0	7	7	50.0	7	7	50.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	68	0	0	139	52	27.2	213	348	62.0	271	245	47.5	329	254	43.5
Supply (10^6 gal/d)	0.1	0	0	0.2	0.1	33.0	0.3	0.6	66.7	0.4	0.4	50.0	0.5	0.4	44.4
Storage (10^6 gal/d)	0.1	0	0	0.1	0.1	50.0	0.2	0.3	60.0	0.2	0.2	50.0	0.3	0.2	40.0
Treatment (10^6 gal/d)	0.1	0	0	0.2	0.1	33.0	0.3	0.6	66.7	0.4	0.4	50.0	0.5	0.4	44.4
Sewage system (10^6 gal/d)	0.1	0	0	0.1	0.1	50.0	0.1	0.1	50.0	0.1	0.1	50.0	0.1	0.1	50.0
Other Services															
Parks (acres)	2	0	0	3	1	25.0	4	7	63.6	6	5	45.5	7	5	41.7
Libraries															
Books	418	0	0	858	318	27.0	1,318	2,152	62.0	1,678	1,516	47.5	2,038	1,572	43.5
Space (sq ft)	105	0	0	215	80	27.1	330	538	62.0	420	379	47.4	510	343	43.5

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

holding cells and a third of the demand for public health nurses and emergency medical services in 2005 would be generated by the low scenario.

The low commercial development scenario would cause less than 3% of the total demand for housing, education, and library services in Emery County in 1985. Between 7.1% and 33.3% of the utility service demands would be induced by the low scenario in 1985. Table 4.54 indicates that by 2005, this is projected to change to 33% of housing, 20% of education, and 25% to 28% of utility and library services. About one-third of the total hospital beds, most medical personnel, police officers, patrol cars, and parks would be required by the low scenario in 2005. The low scenario would also account for half of the emergency medical services, juvenile holding cells, mental health care services, and public health nurses in the same year.

In Garfield County, all of the service demands in 1985 would be the result of the baseline projections (see Table 4.55). Between 1990 and 2005, one quarter to one half of the demand for most health care and public safety services would be caused by the low scenario projects. The demand for all other services created by the low commercial development scenario would range from 1.8% of the students in 1990 to 12.5% of the park acreage in 1995.

With the exception of education, most of the other services needed in Grand County in 1985 would be the result of the low scenario. In subsequent years, a lesser -- but still high -- proportion of the total demand would be attributed to the low commercial development scenario. Table 4.56 indicates that in 2005, the low scenario is projected to cause from 75% to 93% of the utility services demand, over 90% of the library services demand, 88% of the housing demand, 60% of the education demand, and from 50% to 91% of the health care and public safety demands.

In Uintah County, the low commercial development scenario would produce 3% of the housing, education, and library service demands in 1985. The low scenario would cause 3.6% to 16.7% of the utility service demands in 1985. This proportion would increase to about nine percent in 2005. For health care services, the low scenario would create none of the need for long-term care hospital beds in 1985 but half of the mental health care services throughout the 20 year period. Similar differences are expected for public safety services (see Table 4.57).

All of the infrastructure service demands in Wayne County in 1985 would be the result of the baseline projections. But between 50% and 65% of the demand for most services in 1995 would be created by the low commercial development scenario. Table 4.58 shows that in 2005, between 40% and 50% of the service demands are projected to occur in the low scenario. The sole exception would be long-term care hospital beds, where only 14.3% of the demand in 2005 would be due to the low scenario.

4.2.2.4 Indian Reservation Impacts

The county and CCD totals presented in the previous evaluations of population, employment and infrastructure already include the impacts on the Uintah-Ouray Indian Reservation. Those impacts specific to the reservation are identified and analyzed in the following section. The only impacts discussed are the population and household impacts, due to the fact that the UPED model did not provide personal income and employment figures for such a detailed geographic level. The necessary information was also unavailable to make public and private infrastructure projections. Total infrastructure demands on the counties and CCDs involved, however, do include the impacts in these categories which occur on the reservation.

A survey was conducted by the Ute tribe appraising the attitudes of its members concerning possible energy developments in the Uintah Basin. It was found that the Utes had many of the same concerns and apprehensions that non-Indians had regarding possible energy development in the area. They were most concerned that their wilderness areas would be ruined (especially in the Hill Creek extension). They were also worried that pollution would increase and that already strained public services would be over-extended. They were, however, excited over the possibility that energy development would increase employment opportunities, stimulate the economy, and encourage young people to remain on the reservation.

Under the low scenario, population growth is projected to increase steadily throughout the period. It is projected to increase from 66 above the baseline in 1985 to 397 in 2005; a 500% increase overall (see Table 4.59). Table 4.60 shows that the population growth caused by the proposed tar sands developments would account for between 2.5% and 11% of the total population growth on the reservation. The increase in population growth would be greatest from 1985 to 1995, when, on the average, it would increase by 18.3% each year.

The number of households would also experience this steady increase throughout the period studied. From 1985 to 2005, it is projected that the number of households due to the tar sands developments would increase almost fourfold, from 24 to 110 above the baseline. Although the increase is steady throughout the 20 year period, the households projected under the low commercial scenario would never make up more than 6% of the total growth in households.

Table 4.59 Summary of Regional Socioeconomic Impacts by Category and Window Year for the Low Commercial Development Scenario -- Uintah Ouray Indian Reservation[a]

Socioeconomic Development Category	Change from Baseline, by Year					Percent Change	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Population	66	306	353	390	397	501.5	18.26	1.18
Households (No. of units)	24	97	97	106	110	358.3	14.99	1.27

[a]Reservation is defined as the unincorporated portions of the Roosevelt and the Uintah and Ouray Census County Divisions

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 4.60 Comparison of Population and Household Impacts on the Reservation: Low Commercial Development Scenario and Baseline Projections

Year and Cause of Change	Socioeconomic Development Category	
	Population Growth	Household Growth
1985		
Projected Baseline Increment	2,667	1,690
Low Scenario		
Number	66	24
Percent of Total	2.4	1.4
1990		
Projected Baseline Increment	3,773	1,938
Low Scenario		
Number	306	97
Percent of Total	7.5	4.8
1995		
Projected Baseline Increment	3,766	1,904
Low Scenario		
Number	353	97
Percent of Total	8.6	4.8
2000		
Projected Baseline Increment	3,455	1,930
Low Scenario		
Number	390	106
Percent of Total	10.1	5.2
2005		
Projected Baseline Increment	3,197	1,973
Low Scenario		
Number	397	110
Percent of Total	11.0	5.3

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

5 SOCIOECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT OF THE OTHER ENERGY PROJECTS IN EAST-CENTRAL UTAH

There are numerous energy projects (other than tar sands) planned or projected for development in east-central Utah. This section analyzes the potential socioeconomic impacts of those "other" energy projects relative to the projected baseline conditions described in Sec. 2. The cumulative effects of the forecast population, employment, and infrastructure impacts on the tar sands projects are addressed in Sec. 6.

5.1 MANPOWER REQUIREMENTS AND PROJECT DESCRIPTIONS

This section identifies and briefly describes the anticipated or planned energy projects located in the general proximity of the special tar sands areas (STSAs). Some of the projects analyzed, such as the oil shale developments, may compete not only for the socioeconomic resources in the region but also for land area, since they are located so close to one another.

There are three types of energy developments considered herein: oil shale, tar sands, and coal mines. There are also four projects that do not fit into these categories, but are still included in the analysis. Table 5.1 identifies each project and its respective facility size and annual manpower requirements. Construction and operation employment are presented when the data were available. A discussion of these developments on a project-by-project basis follows.

5.1.1 Oil Shale Projects

There are nine oil shale projects anticipated in east-central Utah. Total production from these projects is expected to reach 370,500 barrels per day (bbl/d). In 1995, a work force of 13,945 workers, primarily involved in plant operations, would be required.

The Geokinetics-Lofreco project is an underground in-situ retorting project located at 11 separate sites in southeastern Uintah County. It is one of two Geokinetic projects in the area. Both operation and construction activities begin in 1984, and would require a total of 150 workers. Manpower would reach its peak in 1993 (200 for construction and 1,300 for operation) and remain at that level for the rest of the period studied. This project is presently designed for 50,000 barrels per day of shale oil production.

The other Geokinetic project -- Agency Draw -- is located west of the Lofreco site, and on the eastern border of the Uintah and Ouray Indian Reservation in Uintah County. It is an aboveground retorting process. The demand for construction workers is projected to peak in 1986 at 1,040. From

Table 5.1 Manpower Requirements for the Other Energy Developments Proposed in East-Central Utah

Project	Type of Development	Project Size[a]		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Geokinetics (Lofreco)	Oil Shale	50,000 bbl/d	Construction	0	0	0	20	40	60	80	100	120	140	160	180	200	200	200
			Operation	0	0	0	130	260	390	520	650	780	910	1,040	1,170	1,300	1,300	1,300
Geokinetics (Agency Draw)	Oil Shale	20,000 bbl/d	Construction	0	0	0	480	780	1,040	0	0	320	120	0	0	0	0	0
			Operation	0	0	0	0	320	320	640	640	640	720	720	720	720	720	720
Syntana-Utah	Oil Shale	57,000 bbl/d	Construction	0	0	240	950	1,525	190	125	700	1,350	150	125	700	1,350	65	0
			Operation	0	0	0	0	255	660	790	780	910	1,290	1,400	1,400	1,525	1,975	2,100
EnerCor Pilot Plant	Oil Shale	5,000 bbl/d	Construction	0	130	200	200	75	0	0	0	0	0	0	0	0	0	0
			Operation	0	0	60	120	275	275	275	275	275	275	275	275	275	275	275
Paraho	Oil Shale	42,000 bbl/d	Construction	0	110	925	1,430	2,075	1,355	550	0	0	0	0	0	0	0	0
			Operation	0	0	0	0	725	960	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Tosco	Oil Shale	45,000 bbl/d	Construction	0	0	190	770	2,625	3,590	1,920	240	115	0	0	0	0	0	0
			Operation	0	0	25	330	510	665	1,340	2,070	2,185	2,185	2,185	2,185	2,185	2,185	2,185
Sohio	Oil Shale	20,000 bbl/d	Construction	0	0	0	0	0	0	450	1,525	375	0	0	0	0	0	0
			Operation	0	0	0	0	0	0	0	0	445	820	820	820	820	820	820
Magic Circle	Oil Shale	31,500 bbl/d	Construction	0	380	725	550	520	820	780	0	0	0	0	0	0	0	0
			Operation	0	60	175	450	835	1,430	1,755	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890
White River Shale	Oil Shale	100,000 bbl/d	Construction	0	175	1,830	1,030	345	1,030	2,390	4,035	3,795	2,940	2,880	1,620	280	0	0
			Operation	0	0	10	70	370	840	885	990	1,285	1,865	2,215	2,490	3,040	3,355	3,355
C and A Tar Sands	Tar Sands	20,000 bbl/d	Construction	0	45	0	125	200	225	0	0	0	0	0	0	0	0	0
			Operation	0	0	0	65	145	320	320	320	320	320	320	320	320	320	320
Western Tar Sands	Tar Sands	5,000 bbl/d	Construction	0	25	0	0	50	50	0	0	0	0	0	0	0	0	0
			Operation	0	4	4	4	0	0	7	7	7	7	7	7	7	7	7
Chevron/Great National	Tar Sands	NA[b]	Construction	0	0	0	1,000	2,400	1,000	0	0	0	0	0	0	0	0	0
			Operation	0	0	0	0	200	200	200	200	200	200	200	200	200	200	200
Deserado Mine	Coal Mine	2.0 x 10^6 t/y	Construction	0	0	0	0	0	0	0	5	100	38	0	0	0	0	0
			Operation	0	0	0	0	0	0	0	9	94	218	240	240	240	240	240
Sunedco	Coal Mine	5.0 x 10^6 t/y	Total	0	0	0	115	335	328	495	589	655	750	775	775	775	775	775
U.S. Fuels	Coal Mine[c]	2.2 x 10^6 t/y	Total	0	0	0	163	169	194	394	369	344	568	568	568	568	568	568
Western Reserve	Coal Mine	0.3 x 10^6 t/y	Total	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40
Blazon	Coal Mine	1.0 x 10^6 t/y	Total	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
UCO	Coal Mine	0.7 x 10^6 t/y	Total	0	0	0	109	109	109	109	109	109	109	109	109	109	109	109
First Western	Coal Mine	0.3 x 10^6 t/y	Total	0	0	0	40	35	30	20	10	2	0	0	0	0	0	0

Table 5.1 (Cont'd)

Project	Type of Development	Project Size		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C and W	Coal Mine[c]	0.3 x 10^6 t/y	Total	0	0	0	35	35	0	0	0	0	0	0	0	0	0	0
Price River	Coal Mine[c]	1.9 x 10^6 t/y	Total	0	0	0	413	413	413	413	413	413	413	413	413	413	413	413
Coastal States	Coal Mine	4.0 x 10^6 t/y	Total	0	0	0	82	70	348	476	604	680	680	680	680	680	680	680
Valley Camp	Coal Mine[c]	2.6 x 10^6 t/y	Total	0	0	0	234	199	210	210	210	210	560	560	560	560	560	560
Beaver Creek-Hunt.	Coal Mine[c]	0.3 x 10^6 t/y	Total	0	0	0	25	25	22	20	17	14	0	0	0	0	0	0
Natomas	Coal Mine[c]	0.4 x 10^6 t/y	Total	0	0	0	165	146	130	114	97	82	78	78	78	78	78	78
Utah Power and Light	Coal Mine[c]	NA	Total	0	0	0	78	0	0	0	0	0	50	50	50	50	50	50
North Horn Mtn.	Coal Mine	1.0 x 10^6 t/y	Total	0	0	0	0	0	0	62	89	123	135	162	195	234	281	337
Kaiser-South Lease	Coal Mine	1.0 x 10^6 t/y	Total	0	0	0	50	56	112	206	300	450	475	475	475	475	475	475
Emery Co. - North, Central, and South Leases	Coal Mine	1.0 x 10^6 t/y	Total	0	0	0	0	0	0	123	136	162	103	124	149	178	214	257
Bonanza Power Plant - Unit 2	Other	400 MW	Construction	0	0	0	0	0	0	0	380	506	781	692	300	0	0	0
			Operation	0	0	0	0	0	0	0	0	20	20	66	80	80	80	80
Water Development Projects	Other	NA	Construction	0	0	0	10	20	40	50	80	130	170	110	30	3	0	0
			Operation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White River Dam	Other	NA	Construction	0	94	94	36	36	0	0	0	0	0	0	0	0	0	0
			Operation	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5
Ramex	Other	NA	Construction	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0
			Operation	0	0	0	50	50	50	50	50	50	50	50	50	50	50	50
Totals	Tar Sands / Oil Shale	395,500 bbl/d	Construction	0	1,009	4,254	6,601	10,691	9,400	6,345	7,065	6,811	4,339	3,967	2,830	1,833	265	200
	Coal Mines	24.0 x 10^6 t/y	Operation[d]	0	64	274	2,742	5,556	8,025	10,583	11,983	13,504	15,850	16,581	17,088	17,931	18,779	19,003

[a]bbl/d = barrels/day; x 10^6 t/y = million tons/year.

[b]NA = not available.

[c]Represents an expansion of existing coal mining activities.

[d]Coal mine employment requirements are included in the operation total because the data provided did not distinguish between construction and operation phases. Moreover, mines often have relatively short construction time periods and employ construction workers that eventually become operations workers.

Source: Utah State Planning Coordinators Office, unpublished information (May 1983) and Utah State Energy Office, et al., Final Socioeconomic Technical Report, Uintah Basin Synfuels Development (Feb. 1983).

1991-1995, all manpower would be devoted to plant operations. Peak manpower requirements are expected to occur in 1986, when a total of 1,360 workers would be needed. Peak production for this project would be 20,000 barrels per day.

The Syntana-Utah project is the second largest oil shale project proposed in Utah. Maximum production is currently scheduled to be 57,000 barrels per day. Manpower requirements are projected to peak in 1989, with a total of 2,260 workers needed. Construction manpower requirements would fluctuate throughout the 12 year period: peaks would occur in 1985 (1,525), 1989 (1,350), and 1993 (1,350) indicating a three-phase development program. Operation manpower would increase steadily to a maximum of 2,100 in 1995. The Syntana-Utah project is located on the Colorado border just outside of Bonanza, Utah.

The EnerCor pilot plant project is the smallest oil shale project, with production of only 5,000 barrels a day. It is located on two sites: just east of the Lofreco project in Uintah County, and south of the Lofreco project on the border between Uintah and Grand counties. The four year construction program would be completed in 1985. Peak manpower requirements are forecast to occur in 1984; 320 workers are required in that year. Plant operations would require 275 workers from 1985 through 1995.

The Paraho project is located on the southern edge of the Syntana-Utah project. Construction employment on this project would peak in 1985 when 2,075 workers are needed; 725 additional workers would be required in this year for the operation phase. Plant operations would require 1,100 workers beginning in 1987. According to current plans, a 42,000 barrels per day plant is proposed.

The Tosco oil shale project is located to the west of the Paraho project on the White River, southeast of Ouray. It is expected to produce 45,000 barrels per day of shale oil when completed. This project would require the second largest construction work force of all oil shale projects; a peak of 3,590 workers would be required in 1986. Construction would be completed in 1989, the same year when 2,185 workers would be needed for plant operations. Manpower requirements peak in 1986 when 4,255 workers are scheduled to be employed.

The oil shale project proposed by Sohio has only a three year construction schedule; however, it is designed to produce 20,000 barrels per day. Company plans indicate that construction would commence in 1987, with a 1989 completion date. Manpower requirements are projected to peak in 1988 when 1,525 workers would be required for construction. Plant operations would require 820 workers beginning in 1990. The Sohio project is located just south of Vernal, Utah.

The Magic Circle project is south of the Tosco site. It would produce as much as 31,500 barrels per day of shale oil. Construction would cease in

1987 when the manpower requirements are projected to reach their peak of 2,535. According to Magic Circle, plant operations employment would begin in 1982 with 60 workers but would continue to expand until 1988 when 1,890 workers are employed.

The White River Shale project is the largest of the oil shale projects proposed in Utah with production of 100,000 barrels per day. It also has the largest construction and operation manpower requirements. Plant employment is scheduled to peak in 1989 when 5,080 workers would be needed. After construction is terminated in 1993, 3,355 workers would be needed for yearly plant operation. The White River Shale project is located southwest of the Paraho project and southeast of the White River Dam.

5.1.2 Tar Sands Projects

There are three tar sands projects anticipated in east-central Utah that are not directly analyzed in this report. According to the manpower profiles available, a total of 527 workers would be required to operate all three plants. Total production is scheduled to reach at least 25,000 bbl/d; the Chevron/Great National project was not included in this production figure (because an estimate was not available when this report was being prepared).

The largest tar sands project of the three identified in Table 5.1 is the C and A Tar Sands project. Plant production would reach 20,000 bbl/d in 1986. The maximum work force requirements occur in 1986 (545 workers) when the plant would become fully operational. Three hundred twenty workers would be needed to operate the plant each year from 1986. The project is located on the extreme northern edge of Grand County, east of the EnerCor project.

The Western Tar Sands project is designed to produce 5,000 bbl/d. Manpower requirements peak in 1985 and 1986 when 50 workers would be needed, all for construction activities. Seven workers would be needed for the operation phase beginning in 1987. This project is located north of the Syntana-Utah project.

The Chevron/Great National project is located 1.5 mi south of East Carbon in Carbon County. Two surface mining areas are included in its proposal: a 160 acre site in the middle of the Sunnyside STSA and a 1,400 acre tract of private land between the Amoco and Monopower project sites. A maximum of 2,600 workers would be needed to develop this project in 1985, 2,400 of them for construction. The operation phase would require 200 workers annually beginning in 1985. As indicated, a production figure was not available.

5.1.3 Coal Mining Projects

There are 17 coal mines proposed for development or expansion in Carbon and Emery counties. Total production is anticipated to reach 24 x 10^6 tons/y if all mines are developed according to the proposals. If this level of production is attained, 4,596 additional miners would be employed in 1995.

The Deserado Mine is the only project being considered that is outside of Utah; it is located in northeastern Rio Blanco County in Colorado. Construction at the mine would begin in 1988 and run through 1990. Mine production would require 240 workers from 1991 until all the coal is extracted.

The Sunedco project would produce 5.0 x 10^6 tons/y, which makes it the largest mine proposed. In 1984, 115 workers would be needed. This figure is projected to increase steadily until 1991 when 775 workers would be required. The mine is located outside of East Carbon.

The U.S. Fuels project is proposed as an expansion of an existing coal mine. The planned expansion would increase production by 2.2 x 10^6 tons/y. New mine employment would be 163 in 1984 and expand to 568 in 1990. The U.S. Fuels mine is located near Helper in Carbon County.

The Western Reserve mine is situated near Price. Production is scheduled to reach 0.3 x 10^6 tons/y. A constant work force of 40 miners would be needed from the start of the project in 1987 through 1995.

The Blazon mine is anticipated to produce 1.0 x 10^6 tons/y. Fourteen miners would be required to produce this quantity of coal beginning in 1984. The mine is located outside of Helper in Carbon County.

The UCO mine is also being developed near Helper. From 1984 through 1995, 109 miners would be required to extract the 0.7 x 10^6 tons/y of coal. This would be a much more labor-intensive mine when compared to the Blazon mine.

The First Western project is presently scheduled to produce 0.3 x 10^6 tons/y. Due to the size of the coal reserve, mine employment would decline from 40 in 1984 to two in 1989. Thereafter, no production is scheduled. This mine is located near Helper.

The C and W mine is one of the eight mines being developed near Helper. A 0.3 x 10^6 tons/y expansion of current mine production is planned. Thirty-five additional workers would be needed in 1984 and 1985, but none thereafter.

The Price River mine, found near Helper, is expected to produce 1.9 x 10^6 tons/y of coal. Mine employment would be constant throughout the period; 413 workers would be required each year from 1984 through 1995.

The Coastal States mine is also located near Helper. At 4.0×10^6 tons/y, production would be the second highest in the area. Mine employment would increase from 82 in 1984 to 680 in 1989 to produce this quantity of coal.

The Valley Camp mine is the last of the eight mines near Helper. It is designed to produce 2.6×10^6 tons/y; third highest in the area. Mine employment is projected to fluctuate from 234 in 1984, to 210 in 1986 through 1989, to 560 in 1990 through 1995. This proposed project would be an expansion of the existing mining activities.

The Beaver Creek-Huntington mining project is also an expansion of existing operations. Additional production is anticipated to be 0.3×10^6 tons/y. Mine employment from this expansion would decline from 25 workers in 1984 and 1985 to 14 in 1989. After 1989, mine employment from the 0.3×10^6 tons/y expansion is forecast to be zero. This mine is located near Castle Dale in Emery County.

The Natomas mine is also located near Castle Dale. Mine production is proposed for 0.4×10^6 tons/y. In 1984, 165 miners would be needed. This demand would decline to 78 miners for the period 1990 to 1995. This mine is proposed as an expansion of existing mining activities.

The Utah Power and Light mine is expected to employ 78 miners in 1984. Thereafter, no manpower would be required until 1990, when 50 miners would be employed through the end of the study period. An estimated production level was not available. This mine, which is located near Castle Dale, would expand on existing mining activities.

The North Horn Mountain mine is one of four mines being developed near Castle Dale. Mine production of 1.0×10^6 tons/y is proposed. To extract this quantity of coal 62 miners would be required in 1987 and 337 by 1995.

The Kaiser-South lease project has a proposed production level of 1.0×10^6 tons/y. The mine is near the city of Green River in Emery County. In 1984, 50 miners would be required. However, this figure would increase steadily to 475 miners by 1990.

The prospective Emery County mines -- North, Central, and South Leases -- are located near the city of Emery. Total production from these leases would be 1.0×10^6 tons/y. Mine employment is expected to fluctuate throughout the 1981-1995 period. Miners would not be needed until 1987, when 123 workers would be employed. In 1990, only 103 miners would be needed. A peak of 257 miners is expected in 1995.

5.1.4 Other Projects

In addition to the oil shale, tar sands, and coal mine developments, there are four other projects to consider. These projects are identified in Table 5.1.

The Bonanza Power Plant - Unit 2 is the second generating unit of an existing power plant. It would have a capacity of 400 megawatts when completed. The Bonanza Power Plant is located west of Bonanza in Uintah County. Construction of this second unit is forecast to begin in 1988 and run through 1992, with a peak construction work force of 781 in 1990. It is estimated that 80 workers would be required for normal plant operations.

The Water Development Projects are projects of the Bureau of Reclamation. No permanent employment is expected, but up to 170 workers would be needed during the construction phases. These projects are located in the Uintah Basin.

Construction of the White River Dam would require 94 workers in 1982 and 1983 and 36 in 1984 and 1985. Five workers would be needed for plant operations from 1985 to 1995. The dam is located on the White River, just east of the Paraho project.

The Ramex project is an experimental technology project that would require 50 workers each year from 1981 to 1995. It is located south of the Bonanza Power Plant in Uintah County.

5.1.5 Location of Energy Projects in the Tar Sands Areas

All of the proposed oil shale projects and two of the tar sands developments are located in the area designated as the Uintah Basin. Due to their location, the Asphalt Ridge, Raven Ridge, Hill Creek and P.R. Spring Special Tar Sands Areas (STSA) would have the greatest likelihood of being impacted by these energy projects. P.R. Spring has three developments within its borders: the EnerCor Plant, Geokinetics-Lofreco, and the C and A Tar Sands project. The P.R. Spring STSA is also adjacent to the White River shale development, the largest proposed oil shale project in Utah. The Geokinetics-Agency Draw project is in the Hill Creek STSA. Hill Creek is also adjacent to the Geokinetics-Lofreco and EnerCor projects. The Raven Ridge STSA would potentially be affected by the Syntana-Utah and Paraho oil shale projects, as well as the Western Tar Sands development and the Bonanza Power Plant. The Sohio oil shale project is located in the Asphalt Ridge STSA. Because of the relative proximity of these energy projects, all four identified STSAs have the potential to be adversely affected by the simultaneous development of the other energy projects in the Uintah Basin.

Development of the Sunnyside, Argyle Canyon, and San Rafael Swell STSAs should not be negatively affected by the proposed oil shale and tar sands

developments identified above. They may, however, be affected by the numerous coal mine developments. The Sunedco and U.S. Fuels mines together with the Chevron/Great National tar sands development are adjacent to the Sunnyside STSA in Carbon County. There are also nine coal mining projects near Price and Helper which could affect the manpower schedules and development plans of the Sunnyside and Argyle Canyon STSAs. The San Rafael Swell STSA is relatively close to all of the Emery County energy developments: the projects near the city of Emery, the Kaiser developments in Green River, and the four coal mine developments around Castle Dale. All of these other energy projects could influence the magnitude of impact associated with the development of the San Rafael Swell STSA.

The Tar Sands Triangle and the Circle Cliff STSAs should remain virtually unaffected by the development of these other energy projects due to their relatively remote locations.

5.2 REGIONAL SOCIOECONOMIC IMPACTS - OTHER ENERGY PROJECTS

This section contains a regional summary of the socioeconomic impacts that would potentially arise from the development of the other energy projects (see Table 5.1 for a list of the projects). The region, in this analysis, is composed of Carbon, Duchesne, Emery, and Uintah counties.

Two important assumptions underlie these projections of socioeconomic impacts. The first assumption is that the baseline projections (described in Sec. 2) would accurately reflect the socioeconomic composition of the counties in the time period under study. The second assumption is that the manpower requirements of the other energy projects (described in Sec. 5.1) would not change. Given these two assumptions, the following analysis is based on the difference between the baseline projections and the projected impacts of the other energy projects.

Table 5.2 contains a summary of the regional impacts on population, employment, and infrastructure; Table 5.3 presents the employment impacts by industrial sector; and Table 5.4 shows the wage and personal income projections as a result of the other energy developments.

5.2.1 Total Regional Impact on Socioeconomic Development Factors

Table 5.2 presents the regional socioeconomic impacts by development category and window year. All of the projections of socioeconomic impact are depicted as a change from the baseline conditions in each window year. That is, the population, employment, and infrastructure impacts by category would be in addition to those impacts forecast under the baseline conditions. The impacts by category are briefly discussed below.

The change in the regional population is projected to grow by 166% over the period studied, or more than 2.5 times what is projected to exist over the

Table 5.2 Summary of Regional Socioeconomic Impacts by Category and Window Year Resulting from the Development of the Other Energy Projects in East-Central Utah

Socioeconomic Development Category	Change from Baseline, by Year					Cumulative Growth Factor[a]	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Population Growth								
Total	36,244	56,456	73,477	85,873	96,291	2.66	7.32	2.74
School-Age (5-17)	6,158	10,657	18,877	26,627	32,508	5.28	11.85	5.59
Retirement-Age (≥65)	394	891	1,465	1,648	1,797	4.56	14.03	2.06
Employment Growth	21,089	29,415	33,180	36,842	39,860	1.89	4.63	1.85
Household Growth	11,019	17,450	21,612	24,323	27,132	2.46	6.97	2.30
Infrastructure Requirements								
Housing								
Single family units	6,611	10,469	12,967	14,594	16,109	2.44	6.97	2.19
Multifamily units	1,652	2,617	3,242	3,649	4,026	2.44	6.97	2.19
Mobile homes	2,755	4,364	5,404	6,082	6,712	2.44	6.97	2.19
Education								
Students	6,158	10,657	18,877	26,627	32,508	5.28	11.85	5.59
Classrooms	247	425	754	1,065	1,301	5.27	11.81	5.61
Teachers	247	425	754	1,065	1,301	5.27	11.81	5.61
Health Care								
Hospital beds								
General care	72	112	147	172	191	2.65	7.40	2.65
Long-term care	16	35	59	66	71	4.44	13.94	1.87
Medical personnel								
Doctors	21	34	44	52	57	2.71	7.68	2.62
Dentists	19	28	37	44	49	2.58	6.89	2.85
Nurses	61	96	125	145	162	2.66	7.44	2.63
Public health nurses	8	12	16	18	19	2.38	7.18	1.73
Mental health care								
Clinical psychologists	4	5	5	6	6	1.50	2.26	1.84
Mental health workers	5	7	7	10	11	2.20	3.42	4.62
Public Safety								
Law enforcement								
Police officers	72	113	147	172	191	2.65	7.40	2.65
Patrol cars	72	113	147	172	191	2.65	7.40	2.65
Jail space (sq ft)	18,123	28,363	36,738	42,937	47,392	2.62	7.32	2.58
Juvenile holding cells	6	8	11	12	13	2.17	6.25	1.68
Fire Protection								
Water flow (gpm)/ duration (hr)[b]								
Emergency Medical Service								
Ambulances	8	12	16	18	19	2.38	7.18	1.73
Emergency medical technicians	50	78	112	126	133	2.66	8.40	1.73
Utility Service Demands								
Water system								
Connections	11,692	18,213	23,704	27,703	30,733	2.63	7.32	2.63
Supply (10^6 gal/d)	6,828	10,637	13,843	16,178	17,948	2.63	7.32	2.63
Storage (10^6 gal/d)	3,414	5,318	6,922	8,089	8,974	2.63	7.32	2.63
Treatment (10^6 gal/d)	6,828	10,637	13,843	16,178	17,948	2.63	7.32	2.63
Sewage system (10^6 gal/d)	1,322	2,060	2,682	3,134	3,478	2.63	7.33	2.63
Solid waste[c]								

Table 5.2 (Cont'd)

Socioeconomic Development Category	Change from Baseline, by Year					Cumulative Growth Factor[a]	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Utility Service Demands (Cont'd)								
Other Services								
Parks (acres)	217	339	441	515	572	2.64	7.35	2.64
Libraries								
Books	72,488	112,912	146,954	171,746	190,532	2.63	7.32	2.63
Space (sq ft)	18,122	28,228	36,739	42,937	47,633	2.63	7.32	2.63

[a]Computed as the ratio between 1985 and 2005.

[b]Fire protection measured in water flow in fire hydrants (gpm)/duration (hr) cannot be aggregated across the affected counties. See Tables 5.17-5.20 for county-specific detail.

[c]The State of Utah community facility guidelines do not include a solid waste standard. Therefore, an estimate of solid waste disposal impacts could not be determined.

baseline in 1985. By 2005, a total of 96,291 additional people would reside in the four county region as a result of the other energy projects. The two age groups are projected to increase at a much faster rate than the total population. School-age population is expected to expand by the greatest percentage, rising from 6,158 in 1985 to 32,508 in 2005 for a 428% increase. Likewise, retirement-age population is also forecast to rise dramatically from 394 in 1985 to 1,797 in 2005 for a 356% increase. The greatest growth in each population category would occur in the period from 1985 to 1995. Total population would rise 7.32% annually from 1985 to 1995, but only 2.74% annually from 1995 to 2005. The annual growth rates for school-age population are 11.85% and 5.59%, respectively, while for the retirement-age population they are 14.03% and 2.06%, respectively.

Total regional employment is also projected to grow rapidly over the 1985-2005 period. In particular, employment would nearly double from 21,089 additional workers in 1985 to 39,860 in 2005. Again, this increase would be most dramatic from 1985 to 1995. In this period, total employment would rise 4.63% annually; in the next 10 years the rate of growth would be only 1.85%. Regional employment growth by industrial sector is described in Sec. 5.2.2.

New households are projected to grow by 146% during the period studied. In the year 2005, there would be 27,132 additional households, compared to only 11,019 in 1985. This growth would translate into an annual increase of 6.97% from 1985 to 1995, and 2.30% from 1995 to 2005. Once again, the 1985-1995 period is expected to experience the faster rate of growth.

The demand for all forms of housing is forecast to increase by 144% from 1985 to 2005. This would be equivalent to a 6.97% annual rate of growth

for the first 10 years and 2.19% for the second 10 years. According to the State of Utah, *Community Facility Guidelines*, single family housing would still be the dominant form of housing through 2005. The standards they propose for the distribution of housing by type are as follows: 60% are single family houses; 25% are mobile homes and trailers; and 15% are multi-family housing units.

Demands on the education system are projected to increase more than fivefold over the entire study period. A 427% overall increase in the number of students would translate into an 11.85% annual rate for the 1985 to 1995 period and 5.59% from 1995 to 2005. Students, classrooms, and teachers all would increase at the same rate because the community standards for classrooms and teachers are based on the number of students.

Like all other categories already discussed, health care services are also expected to realize a large growth in demand from 1985 to 2005. The number of additional hospital beds is projected to increase during this time frame by 165% for general care and 344% for long-term care. The number of beds for long-term care would increase by 13.94% annually over the first 10 years, but by only 1.87% annually in the second 10 years. This slower rate of growth corresponds to that for the retirement-age population.

The demand for medical personnel is forecast to increase by more than 2.5 times the 1985 level during the period 1985-2005. The number of doctors, dentists, registered nurses, and public health nurses are all projected to increase between 138% and 171% over the period studied. All medical personnel would increase by at least 6.9% annually from 1985 to 1995, and by greater than 1.7% annually from 1995 to 2005. In 2005, for instance, there would be 57 additional doctors serving the region, compared to only 21 in 1985 due to the development of the other energy projects. Mental health care would also increase; in 2005 there would be 6 clinical psychologists (compared to 4 in 1985) and 11 mental health workers (compared to 5 in 1985). The number of mental health workers would increase by 3.42% from 1985 to 1995 and by 4.62% from 1995 to 2005. This is the only infrastructure category where there is a greater increase in the last 10 year period than in the first.

A similar magnitude of increase is forecast for each public safety category. Police officers, patrol cars, and jail space would all experience the same relative percentage change, i.e., between 161% and 165%. The rate of growth in additional law enforcement demands between 1985 and 1995 would be 7.4% annually, while for 1995 to 2005 it would be 2.65% annually. The number of additional juvenile holding cells would increase slightly slower than the other law enforcement categories (117% vs. 165%) over the 20 years.

The other area of public safety is emergency medical services. Here, the number of ambulances needed in 2005 is projected to increase by nearly 2.5 times the 1985 level. This would translate into a 7.2% annual increase from 1985 to 1995 and a 1.7% annual increase from 1995 to 2005. Likewise, the number of additional emergency medical technicians (EMT) needed as a result of

the other projects would increase by 1.7% annually from 1995 to 2005 and by 8.4% annually from 1985 to 1995. There would be 50 additional EMTs needed in 1985 and 133 in 2005.

All utility service demands and requirements for other services (parks and libraries) are projected to increase at approximately the same rate during this time period, i.e., more than 2.5 times the level required in 1985. From 1985 to 1995 the rate of growth would be 7.32% annually while from 1995 to 2005 the annual change is expected to be only 2.63%. The rate of growth over the 20 year period is projected to be approximately 163%.

5.2.2 Regional Employment Impacts by Sector

Table 5.3 presents the industrial sector employment impacts for the forecast period 1985-2005. It is estimated that during this 20-year span between 21,091 and 39,860 additional workers would be needed to satisfy the industrial sector employment demands generated by the other energy project developments. This growth in employment would correspond to an 89% change or a 4.64% annual rate for the 1985-1995 period and a 1.85% rate for the latter

Table 5.3 Total Regional Employment Impacts Resulting from the Other Energy Project Developments in East-Central Utah[a]

Industry Sector	Change from Baseline Employment, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	0	0
Mining	5,253	15,441	18,568	18,568	18,568	13.46	0
Contract Construction	10,686	4,690	1,160	1,540	1,810	-19.91	4.55
Manufacturing	99	185	265	324	381	10.35	3.70
Transportation, Communication, and Utilities	259	613	677	801	932	10.09	3.25
Wholesale and Retail Trade	1,426	2,529	3,551	4,261	4,965	9.55	3.41
Finance, Insurance, and Real Estate	193	346	502	621	698	10.03	3.35
Services	922	1,686	2,436	2,984	3,477	10.20	3.62
Government	1,564	2,782	4,286	5,598	6,551	10.61	4.33
Nonfarm Proprietors	687	1,142	1,735	2,145	2,476	9.71	3.62
Total	21,091	29,414	33,181	36,841	39,860	4.64	1.85

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

period. As indicated, Table 5.3 depicts the employment demands that are in addition to those associated with the baseline projections. A discussion of the sectoral employment growth that would arise appears in the following paragraphs.

Agriculture is not projected to have either employment growth or decline over the 20 year period due to the other energy projects. Alternatively, the mining sector is forecast to realize the greatest actual employment growth of all sectors during the first 10 year period; 13,315 additional miners or a 253% increase over 1985. This change in employment would translate into a 13.46% annual rate, the greatest percentage increase among all sectors during the 1985-1995 time frame. The 1995 level of mine employment (18,568) would be maintained throughout the remainder of the study period. Although mine employment does not continue to grow, mining would have the second largest percentage change (253%) over the 1985-2005 period and would account for approximately 50% of the total employment growth attributable to the other energy projects development.

Contrary to the substantial growth in mining employment, contract construction employment is projected to experience a 89% decline over the first 10 years. This would be an annual decrease of 19.91%. This employment trend would be reversed in the final 10 year period, however, and instead is expected to grow at a rate of 4.55% annually.

The manufacturing sector is forecast to experience a 285% increase in employment over the 20 year period; from 99 additional workers in 1985 to 381 in 2005. The change in manufacturing, when employment is presented as an annual rate, would increase by 10.35% between 1985-1995 and by 3.70% from 1995-2005.

Transportation, communication, and utilities employment is projected to increase at approximately the same rate as the manufacturing sector. The overall increase in this sector is forecast to be 260% while the annual rate of growth would be 10.09% from 1985 to 1995 and 3.25% from 1995 to 2005.

Wholesale and retail trade would be the third largest growth sector in 2005. The change from baseline employment is projected to increase from 1,426 workers in 1985 to 4,965 in 2005, a 250% increase overall. This increase would be equivalent to a 9.55% annual rate for the first 10 years and 3.41% rate for the latter 10 years.

Employment in finance, insurance, and real estate would increase 10% per year from 1985 to 1995. From 1995 to 2005, the yearly increase would be 3.35%. The additional 698 workers in 2005 would be 3.6 times the level needed in 1985.

The services sector is projected to experience a 275% increase in employment over the 20 year period, as it would increase from 922 additional employees in 1985 to 3,477 in 2005. This nearly fourfold growth in employment

would represent a 10.2% annual rate of change from 1985 to 1995 and a 3.62% rate for 1995 to 2005 period. The services sector would be the fourth largest growth sector in 2005.

The government sector is expected to realize the greatest employment growth in percentage terms over the entire period; employment in 2005 is 320% greater than in 1985. Yearly increases are projected to be 10.61% for the first 10 years and 4.33% per year thereafter. The total new employment of 6,551 workers in 2005 would make this the second largest employment sector affected by the other energy projects.

Nonfarm proprietors are forecast to experience a 260% increase in employment over the 20 year period. From 1985 to 1995, employment would increase 9.71% annually. This figure would drop to 3.62% annually for the period from 1995 to 2005.

Overall, employment in all sectors except contract construction would increase over the 20 year period. The total change in regional employment (Carbon, Duchesne, Emery, and Uintah counties) would be 39,860 workers in 2005, as a result of the other energy projects.

5.2.3 Regional Impact on Total Wage and Personal Income

The total regional wage and personal income effects of the other energy projects are presented in Table 5.4. The wage and income data are presented by industrial sector and income category. Average monthly wages are assumed to have an approximate annual increase in monthly wages of 1.72%, independent of the other energy projects unless otherwise noted. The number of employees and total wage payments would increase as a result of the other energy developments considered and are expressed as a change from the baseline projections. Each industrial sector is briefly discussed in the following paragraphs.

Mining would have the second highest monthly wage throughout the period. This monthly wage would reach $3,036 in 2005 (1980 $). Combined with the largest industrial sector employment over the 20 year period (as a result of the other projects), the total wage payment in mining would be significantly higher than in any other sector. In 2005, the total wage payment in mining would be more than $56 million. Total wages would grow the most rapidly during the first 10 years by increasing at a 15.4% annual rate, thereafter, total wages would expand by 1.72% annually.

Monthly wages in the contract construction industry are projected to be the highest of any sector in the region. In 2005, the estimated wage would be $3,695 per month. Because of a projected decrease in employment opportunities related to the other energy projects, total wages in this sector would drop from $28.1 million in 1985 to $3.6 million in 1995 and then increase to $6.7 million in 2005. The decrease in total wages between 1985 and 1995 would

Table 5.4 Total Regional Wage and Personal Income Impact Projections by Industrial Sector Resulting from the Other Energy Projects in East-Central Utah[a]

Industrial Sector	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Mining							
Average Monthly Wage (1980 $)	2,157	2,349	2,559	2,787	3,036	1.72	1.72
Change from Baseline							
Number of Employees	5,253	15,441	18,568	18,568	18,568	13.46	0
Total Wage Payment (1980 $)	11,330,721	36,270,909	47,515,512	51,749,016	56,372,448	15.41	1.72
Construction							
Average Monthly Wage (1980 $)	2,625	2,859	3,114	3,367	3,695	1.72	1.73
Change from Baseline							
Number of Employees	10,686	4,690	1,160	1,540	1,810	-19.91	4.55
Total Wage Payment (1980 $)	28,050,750	13,408,710	3,612,240	5,185,180	6,687,950	-18.53	6.35
Manufacturing							
Average Monthly Wage (1980 $)	893	973	1,060	1,154	1,257	1.73	1.72
Change from Baseline							
Number of Employees	99	185	265	324	381	10.35	3.70
Total Wage Payment (1980 $)	88,407	180,005	280,900	373,896	478,917	12.26	5.48
Transportation, Communications, and Utilities							
Average Monthly Wage (1980 $)	1,879	2,047	2,296	2,501	2,724	2.02	1.72
Change from Baseline							
Number of Employees	259	613	677	801	932	10.09	3.25
Total Wage Payment (1980 $)	486,661	1,254,811	1,554,392	2,003,301	2,538,768	12.31	5.03
Wholesale and Retail Trade							
Average Monthly Wage (1980 $)	844	919	1,002	1,091	1,188	1.73	1.72
Change from Baseline							
Number of Employees	1,426	2,529	3,551	4,261	4,965	9.55	3.41
Total Wage Payment (1980 $)	1,203,544	2,324,151	3,558,102	4,648,751	5,898,420	11.45	5.18

Table 5.4 (Cont'd)

Industrial Sector	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Finance, Insurance, and Real Estate							
Average Monthly Wage (1980 $)	925	1,007	1,097	1,195	1,302	1.72	1.73
Change from Baseline							
Number of Employees	193	346	502	599	698	10.03	3.35
Total Wage Payment (1980 $)	178,525	348,422	550,694	715,805	908,796	11.92	5.14
Services							
Average Monthly Wage (1980 $)	767	835	910	991	1,079	1.72	1.72
Change from Baseline							
Number of Employees	922	1,686	2,436	2,984	3,477	10.20	3.62
Total Wage Payment (1980 $)	707,174	1,407,810	2,216,760	2,957,144	3,751,683	12.10	5.40
Government							
Average Monthly Wage (1980 $)	931	1,014	1,144	1,246	1,357	2.08	1.72
Change from Baseline							
Number of Employees	1,564	2,782	4,286	5,598	6,551	10.61	4.33
Total Wage Payment (1980 $)	1,456,084	2,820,948	4,903,184	6,975,108	8,889,707	12.91	6.13
Nonfarm Proprietors (NFP)							
Average Monthly Wage (1980 $)	1,230	1,340	1,459	1,590	1,731	1.72	1.72
Change from Baseline							
Number of Employees	687	1,142	1,735	2,145	2,476	9.71	3.62
Total Wage Payment (1980 $)	845,010	1,530,280	2,531,365	3,410,550	4,285,956	11.60	5.41
Other Labor Income (OLI)							
Average Monthly OLI (1980 $)	106	115	126	137	149	1.74	1.69
Change from Baseline							
Number of Recipients	18,702	27,093	31,176	35,380	38,106	10.38	2.03
Total OLI (1980 $)	1,982,412	3,115,695	3,928,176	4,847,060	5,677,794	7.08	3.75

Table 5.4 (Cont'd)

Industrial Sector	Wages and Employment, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Average Property Income (1980 $)	141	156	170	185	202	1.89	1.74
Population	36,244	56,456	73,477	85,873	95,366	7.32	2.64
Total Property Income (1980 $)	5,110,404	8,807,136	12,491,090	15,886,505	19,263,932	9.35	4.43
Total Monthly Personal Income (1980 $)	51,439,692	71,468,877	83,142,415	98,752,316	114,755,371	4.92	3.27
Average Monthly Per Capita Income (1980 $)	1,419	1,266	1,132	1,150	1,203	-2.23	0.61

[a]The number of employees by industrial sector presented in this table may not equal the total industrial sector employment presented in Table 5.3 because these personal income projections may include communities that are not in the critical impact area (i.e., do not satisfy the 5% growth criteria).

[b]Undefined.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

correspond to a 18.53% annual decline, which would then be reversed over the next 10 years and increase at a 6.35% annual rate.

Manufacturing would have the lowest projected total wage payment of any sector in the 20 years studied. Total wages are projected to increase from $88,407 in 1985 to $478,917 in 2005. This would be less than 1% of the total wages paid to mining employees, but it would still represent a 440% increase over the 20 year period.

From 1985 to 1995, average monthly wages would increase by 2.02% annually in the transportation, communications, and public utilities sector. During the following 1995-2005 period this rate of increase would slow to 1.72% annually. Average monthly wages are projected to rise to $2,724 per month in 2005. This would be the third highest monthly wage projected in the region. Total wage payments would increase by more than fivefold over the 20 years studied due to the other energy projects, to a total of $2.5 million in 2005.

Average monthly wages in wholesale and retail trade would increase from $844 in 1985 to $1,188 in 2005. Combined with the other energy projects employment growth in this sector, the total wage payment would expand to $5.9 million by 2005. This corresponds to nearly a fivefold increase (390%) over the 1985 payment of $1.2 million.

Total wages paid to employees in 2005 would increase to five times the 1985 wages in the finance, insurance, and real estate sector. At $908,796 in 2005, this sector would be the second smallest in terms of the total wage payment. The average monthly wage in this sector would rise to $1,302 in 2005.

In the services sector, average monthly wages are projected to reach $1,079 in 2005, compared to $767 in 1985. Total wage payments would increase 12.10% per year in the first 10 years of the other energy project developments and 5.4% annually thereafter. This would result in a 430% increase in total wage payments between 1985 and 2005.

The government sector would experience the greatest percentage increase in monthly wages and in total wages for this 20 year period. Monthly wages are forecast to increase by 2.08% annually from 1985 to 1995 and by 1.72% annually from 1995 to 2005. The average monthly wage would reach $1,357 in 2005. Total wage payments would increase by 510% over the 20 years due to the energy projects included in this study. The annual rate of growth would be 12.91% for 1985 through 1995 and 6.13% for 1995 through 2005. The total wage payment in 2005 is expected to be $8.9 million, which would be second only to the mining sector payments.

Average monthly wages for nonfarm proprietors would expand from $1,230 in 1985 to $1,731 in 2005. Total wage payments from the other energy projects are projected to increase by more than fivefold in this period, and would approach $4.3 million in 2005.

Other labor income would account for $5.7 million in total wages by 2005. This sector is expected to increase less than most other sectors; however, total wages are still projected to grow by 186% over the 20 years. The average monthly wage would be only $106 in 1985, and would rise to $149 in 2005.

Monthly property income is forecast to rise from $141 to $202 over the period. From 1985 to 1995, this increase would correspond to a 1.89% annual rate of change while from 1995 to 2005 the increase would slow to 1.74% annually. Total property income would reach $19,263,932 in 2005, a nearly fourfold (275% change) increase over 1985.

Total monthly personal income would increase by 4.92% from 1985 to 1995, and by 3.27% from 1995 to 2005. In 1985, total personal income in the region is projected to be greater than $51 million; this would increase to $114.8 million by 2005.

Average monthly per capita income would decrease by 2.23% annually from 1985 to 1995. This would be due mainly to the large projected decrease in employment within the construction sector; it is the only sector projected to experience a decline in employment during this 10 year period. Per capita wages in the region would rise by 0.61% annually from 1995 to 2005, as all sectors are projected to experience an increase in wage payments and employment in this time frame.

5.3 COUNTY-LEVEL SOCIOECONOMIC IMPACT ANALYSIS OF THE OTHER ENERGY PROJECT DEVELOPMENTS

The county-level socioeconomic impacts that would potentially arise from the development of the other energy projects are addressed in this section. Two important assumptions underlie these projections of socioeconomic impacts. The first assumption is that the baseline projections (described in Sec. 2) would accurately reflect the socioeconomic composition of the counties in the time period under study. The second assumption is that the manpower requirements of the other energy projects (described in Sec. 5.1) would not change. Given these two assumptions, the following county-level analysis is based on the difference between the baseline projections and the projected impacts of the other projects.

5.3.1 Population and Household Impacts

This section discusses the trends in population and household growth by county that would be a result of the other energy developments being considered. All data analyzed in this section can be found in Tables 5.5 through 5.9, and Fig. 5.1. All projections are presented as a change from the baseline forecast and thereby, only reflect the population and household growth attributable to the development of the other energy projects in the region.

Table 5.5 Summary of Population and Household Impact Projections by County for the Other Energy Projects in East-Central Utah

County and Window Years	Population		New Households		School-Age Population (5-17)		Retirement-Age Population (≥65)	
	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]	Change from Baseline	Average Annual % Change[a]
Carbon County								
1985	10,627	-	3,864	-	2,017	-	236	-
1990	10,502	-0.24	3,334	-2.91	2,052	0.34	480	15.26
1995	14,018	5.95	4,235	4.90	3,679	12.39	567	3.39
2000	15,342	1.82	4,371	0.63	4,790	5.42	600	1.14
2005	16,754	1.78	4,654	1.26	5,037	1.01	629	0.95
Duchesne County								
1985	4,965	-	1,683	-	989	-	24	-
1990	9,542	13.96	3,042	12.57	1,858	13.44	71	24.23
1995	12,333	5.27	3,614	3.51	3,160	11.21	169	18.94
2000	14,910	3.87	4,234	3.22	4,632	7.95	204	3.84
2005	17,167	2.86	4,875	2.86	5,941	5.10	235	2.87
Emery County								
1985	1,712	-	623	-	303	-	42	-
1990	1,722	0.12	547	-2.57	336	2.09	83	14.60
1995	2,952	11.38	892	10.27	779	18.31	124	8.36
2000	3,176	1.47	908	0.36	1,000	5.12	125	0.16
2005	3,364	1.16	935	0.59	1,045	0.88	125	0
Uintah County								
1985	18,940	-	4,849	-	2,849	-	92	-
1990	34,690	12.87	10,527	16.77	6,411	17.61	257	22.81
1995	44,174	4.95	12,871	4.10	11,259	11.92	605	18.68
2000	52,445	3.49	14,810	2.85	16,205	7.55	719	3.51
2005	59,006	2.39	16,668	2.39	20,485	4.80	808	2.36

[a]Computed as average annual compound percent change from previous window year.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

The other project population growth in Carbon County is projected to fluctuate throughout the 1985-2005 period. Between 1985 and 1990, the additional population would decline by 0.24% each year. During this same period, the number of households would decrease by 2.9% per year, while school-age population and retirement-age population would both increase annually, by 0.34% and 15.26%, respectively. From 1990 to 1995, total population, new households and school-age population are all projected to realize their greatest growth for the period under study, at annual percentage rates of 5.95%, 4.90%, and 12.39%, respectively. In the year 2005, total population in Carbon County would be 16,754 people greater than it would be without the other energy developments, or 147% greater than the baseline population projection in the same year.

There are three Census County Divisions (CCDs) within Carbon County: East Carbon, Helper, and Price. The largest and fastest growing CCD, as a result of the other project developments, would be Price, where the total additional population is projected to rise from 6,681 to 13,408, and

Table 5.6 Population and Household Impact Projections by Community for Carbon County - Other Energy Projects[a]

Geographic Area and Impact Category	Change from Baseline Population and Household Projections, by Year[b]				
	1985	1990	1995	2000	2005
East Carbon Census County Division (CCD)					
East Carbon CCD Total					
Population	2,580	1,292	1,528	1,624	1,713
Households	938	410	462	463	476
East Carbon					
Population	1,909	956	1,131	1,202	1,268
Households	694	303	342	343	352
Sunnyside					
Population	671	336	397	422	445
Households	244	107	120	120	124
Unincorporated Areas					
Population	0	0	0	0	0
Helper Census County Division (CCD)					
Helper CCD Total					
Population	1,367	1,157	1,446	1,539	1,634
Households	497	367	437	438	454
Helper					
Population	820	694	868	923	980
Households	298	220	262	263	272
Scofield					
Population	0	0	0	0	0
Households	0	0	0	0	0
Unincorporated Areas					
Population	547	463	578	616	654
Households	199	147	175	175	182
Price Census County Division (CCD)					
Price CCD Total					
Population	6,681	8,048	11,045	12,179	13,408
Households	2,429	2,555	3,337	3,470	3,724

Table 5.6 (Cont'd)

Geographic Area and Impact Category	Change from Baseline Population and Household Projections, by Year[b]				
	1985	1990	1995	2000	2005
Price Census County Division (CCD) (Cont'd)					
Price					
Population	4,343	5,231	7,179	7,916	8,715
Households	1,579	1,661	2,169	2,256	2,421
Wellington					
Population	1,203	1,449	1,988	2,192	2,413
Households	437	460	601	625	670
Hiawatha					
Population	0	0	0	0	0
Unincorporated Areas					
Population	1,136	1,368	1,878	2,070	2,279
Households	413	434	567	590	633

[a]Only those Census County Divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 5.5).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

households are forecast to increase from 2,429 to 3,724. Helper CCD would also experience a significant change in population and household growth, but at a slower rate. Alternatively, the East Carbon CCD is projected to witness a decrease over time in the number of both population and households corresponding to the other project developments. From 1985 to 2005, the change in population is projected to decrease from 2,580 people to 1,713 (-34%) while the number of households would decrease from 938 to 476 (49%).

In Duchesne County throughout the 1985-2005 period, increases over the baseline projection are projected in each population category. The greatest percentage growth due to other projects would be in the period from 1985 to 1990, when annual increases ranging from 12.57% (new households) to 24.33% (retirement-age population) are projected. Absolute population change from

Table 5.7 Population and Household Impact Projections by Community for Duchesne County - Other Energy Projects[a]

Geographic Area and Impact Category	Change from Baseline Population and Household Projections, by Year[b]				
	1985	1990	1995	2000	2005
Roosevelt Census County Division (CCD)					
Roosevelt CCD Total					
Population	4,897	9,404	12,190	14,701	16,769
Households	1,689	2,995	3,575	4,176	4,764
Roosevelt					
Population	3,428	6,582	8,533	10,291	11,742
Households	1,181	2,098	2,501	2,922	3,336
Myton					
Population	171	329	427	515	591
Households	58	105	125	146	168
Unincorporated Areas					
Population	1,298	2,493	3,230	3,895	4,436
Households	450	792	949	1,108	1,260

[a]Only those Census County Divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 5.5).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

the baseline would increase at a substantially higher rate in Duchesne County than in Carbon. Duchesne County is projected to have almost 500 more people than Carbon in the year 2005 (see Fig. 5.1 and Table 5.5). But, more importantly, when the projected baseline population is included, the total 2005 population in Duchesne County is expected to be 196% of the projected baseline while in Carbon County the increase is 145%.

The Roosevelt CCD is projected to experience the same magnitude of change as Duchesne County, where population would differ from the baseline by 16,769 people in 2005, and the number of households would reach a difference of 4,764. All communities within Roosevelt CCD would also experience these

Table 5.8 Population and Household Impact Projections by Community for Emery County - Other Energy Projects[a]

Geographic Area and Impact Category	Change from Baseline Population and Household Projections, by Year[b]				
	1985	1990	1995	2000	2005
Castle Dale-Huntington Census County Division (CCD)					
Castle Dale-Huntington CCD Total					
Population	1,313	1,196	2,016	2,180	2,351
Households	477	380	610	621	653
Castle Dale					
Population	460	419	706	763	823
Households	167	133	214	217	229
Cleveland					
Population	79	72	121	131	141
Households	29	23	37	37	39
Elmo					
Population	53	48	81	87	94
Households	19	15	25	25	26
Huntington					
Population	328	299	504	545	588
Households	119	95	152	155	163
Orangeville					
Population	328	299	504	545	588
Households	119	95	152	155	163
Unincorporated Areas					
Population	66	60	101	109	118
Households	24	19	31	31	33
Emery-Ferron Census County Division (CCD)					
Emery-Ferron CCD Total					
Population	163	458	853	907	921
Households	59	145	258	258	256
Clawson					
Population	0	0	0	0	0

Table 5.8 (Cont'd)

Geographic Area and Impact Category	Change from Baseline Population and Household Projections, by Year[b]				
	1985	1990	1995	2000	2005
Emery-Ferron Census County Division (CCD) (Cont'd)					
Emery					
Population	41	115	213	227	230
Households	15	36	65	65	64
Ferron					
Population	122	344	640	680	691
Households	44	109	194	194	192
Unincorporated Areas					
Population	0	0	0	0	0
Green River Census County Division (CCD)					
Green River CCD Total					
Population	236	67	83	89	92
Households	86	21	25	25	26
Green River					
Population	203	58	71	77	79
Households	74	18	22	22	22
Unincorporated Areas					
Population	33	9	12	12	13
Households	12	3	4	4	4

[a]Only those Census County Divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 5.5).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 5.9 Population and Household Impact Projections by Community for Uintah County - Other Energy Projects[a]

Geographic Area and Impact Category	Change from Baseline Population and Household Projections, by Year[b]				
	1985	1990	1995	2000	2005
Uintah Ouray Census County Division (CCD)					
Uintah-Ouray CCD Total					
Population	445	830	926	1,027	1,100
Households	152	265	272	293	314
Ballard					
Population	223	416	464	514	550
Households	76	133	136	147	157
Unincorporated Areas					
Population	222	414	462	513	550
Households	76	132	136	146	157
Vernal Census County Division (CCD)					
Vernal CCD Total					
Population	13,858	32,011	43,041	51,209	58,043
Households	4,698	10,227	12,585	14,507	16,443
Vernal					
Population	6,165	13,918	18,786	22,328	25,143
Households	2,090	4,441	5,501	6,334	7,123
Naples					
Population	2,772	6,402	8,608	10,242	11,609
Households	940	2,045	2,517	2,901	3,288
Unincorporated Areas					
Population	4,921	11,691	15,647	18,639	21,291
Households	1,668	3,741	4,567	5,272	6,032

[a]Only those Census County Divisions (CCDs) and communities which satisfied the 5% per year growth criterion are of interest and included in this table. All CCDs and communities are included in the county totals (Table 5.5).

[b]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

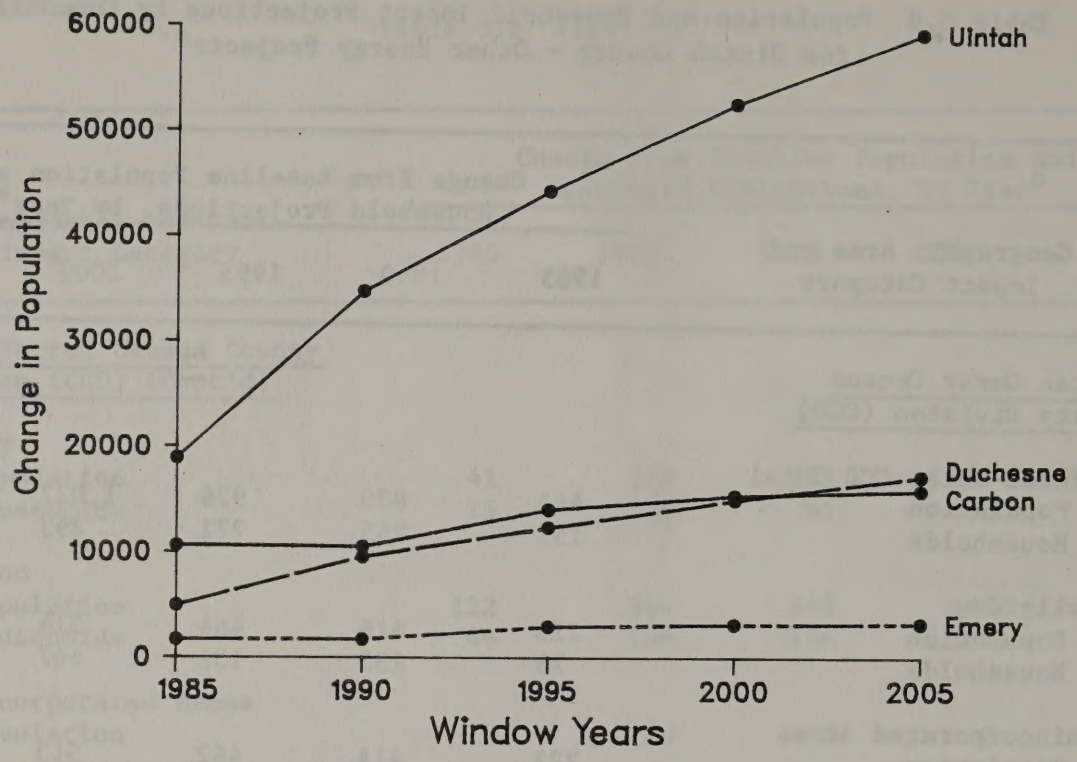

Fig. 5.1 Change in County Populations Due to the Other Energy Projects

increases in population; however, 70% of the growth would be concentrated in the city of Roosevelt. Duchesne CCD is not shown because the projected changes to its population did not satisfy the 5% growth criteria. Duchesne CCD is, however, included in the county totals.

Emery County is forecast to experience very little growth as a result of these other energy developments. Total population would increase by only 3,364 people over the 20 year period. By 2005, Emery County would still be much smaller than the other counties in the region, in terms of the amount of population growth it is projected to receive from the other project developments (see Fig. 5.1). The growth that would occur, for the most part, is projected to occur between 1990 and 1995, when the total change in population would rise by 11.38% annually. School-age population would undergo the most growth during this time period, increasing by 18.31% annually.

Of the three CCDs in Emery County (Castle Dale-Huntington, Emery-Ferron, and Green River), only Green River would not experience additional growth from the other energy projects after 1985. Decreases in Green River CCD are projected in both population (decreasing from 236 people over the baseline to just 92), and in households (dropping from 86 over the baseline to 26). Both the Castle Dale-Huntington and the Emery-Ferron CCDs would experience steady growth throughout the period. The largest increases are expected in the Emery-Ferron CCD, especially in the city of Emery, where

population would increase from 41 people over the baseline in 1985 to 230 over in the year 2005. This would correspond to more than a fivefold change in population between 1985 and 2005.

Uintah County is projected to undergo extremely large increases in population and households over the baseline projections for the period studied. This would be principally due to the numerous oil shale and tar sands developments included in the other projects group that are located in the Uintah Basin. Population growth related to the other energy projects would increase to 59,006 people above the baseline by 2005. This growth would cause total county population to expand by 210% over the 2005 baseline projection. School-age population would rise from 2,849 above the baseline in 1985 to 20,485 more than the baseline in 2005. In the period from 1985 to 1990 all population categories would increase by at least 12.8% annually. In this same period, retirement-age population would increase by 22.81% annually.

The greatest increases in Uintah County are projected for the Vernal CCD, where population is forecast to be 13,858 above the baseline in 1985 and 58,043 above the baseline in 2005. The Vernal CCD would absorb between 73% and 98% of the growth projected for Uintah County. Total population in the Vernal CCD is forecast to expand by 67% over the baseline in 1985 and 255% in 2005. Consequently, by the year 2005 the population in the Vernal CCD would be 3.5 times that projected under the baseline conditions. Households would increase by the same relative percentages, to a total of 16,443 above the baseline in 2005. The city of Vernal would show the greatest increases, as population is projected to rise to 25,143 above the baseline in 2005.

5.3.2 Economic Base and Employment Impacts

This section describes the potential changes to the economic base of the four counties likely to be affected by the development of the other energy projects. Employment growth by sector and county is assessed together with the projections of total personal income and per capita income. As stated previously, the employment effects of the other energy projects are presented herein as a change from the baseline conditions.

5.3.2.1 Total Employment Impacts by County

All four counties are forecast to realize an increase in total employment for each window year throughout the study period (Table 5.10). Duchesne and Emery counties would experience rapid employment growth in the 1985-1995 time frame; their annual growth rates would be 12.35% and 12.95%, respectively. However, the actual level of employment in these two counties, from the development of the other energy projects, is relatively small. This is evidenced by the fact that in the year 2005 employment in Duchesne County is projected to be 4,055 workers above the baseline, while in Emery County the employment would be 1,735 workers above the baseline. In the year 2005,

Table 5.10 Summary of Total Employment Impacts by County - Other Energy Projects in East-Central Utah

County	Change from Baseline Employment Projections, by Year (No. of workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1985-2005
Carbon	5,803	5,394	6,234	6,608	6,803	0.72	0.88
Duchesne	789	1,738	2,528	3,321	4,055	12.35	4.84
Emery	487	1,104	1,646	1,700	1,735	12.95	0.53
Uintah	14,010	21,178	22,772	25,213	27,267	4.98	1.82
Total	21,091	29,414	33,181	36,841	39,860	4.64	1.85

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

total employment in Duchesne County would be 57% greater than the baseline projection and 25% larger in Emery County, as a result of the other energy projects.

Uintah County, alternatively, is not expected to have a high annual percentage increase, but is forecast to have the largest absolute employment change. In 1985, employment in Uintah County is forecast to be 14,010 workers above the baseline, and in 2005 it would be greater by 27,267 workers. This projection of additional employment opportunities would be 132% greater than the estimated baseline employment in 1985 and 233% larger than the forecast employment levels for the year 2005. After the initial growth of 5,803 jobs in 1985, there is very little employment growth projected for Carbon County. This is illustrated by the annual growth rates presented in Table 5.10 where the increase is projected to be 0.72% in 1985-1995 and 0.88% in 1995 to 2005.

Figure 5.2 graphically illustrates these county employment trends. This figure illustrates that Uintah is expected to absorb the greatest amount of employment growth. The majority of the developments included as large energy projects are located within Uintah County, thereby precipitating this employment growth. Employment in the region as a whole would rise from 21,091 jobs above the baseline in 1985 to 39,860 jobs above the baseline in 2005. This would represent a 4.64% annual growth rate in the 1985-1995 period followed by a slower 1.85% rate of change in the 1995-2005 time frame. Uintah County would account for around 68% of this regional employment growth.

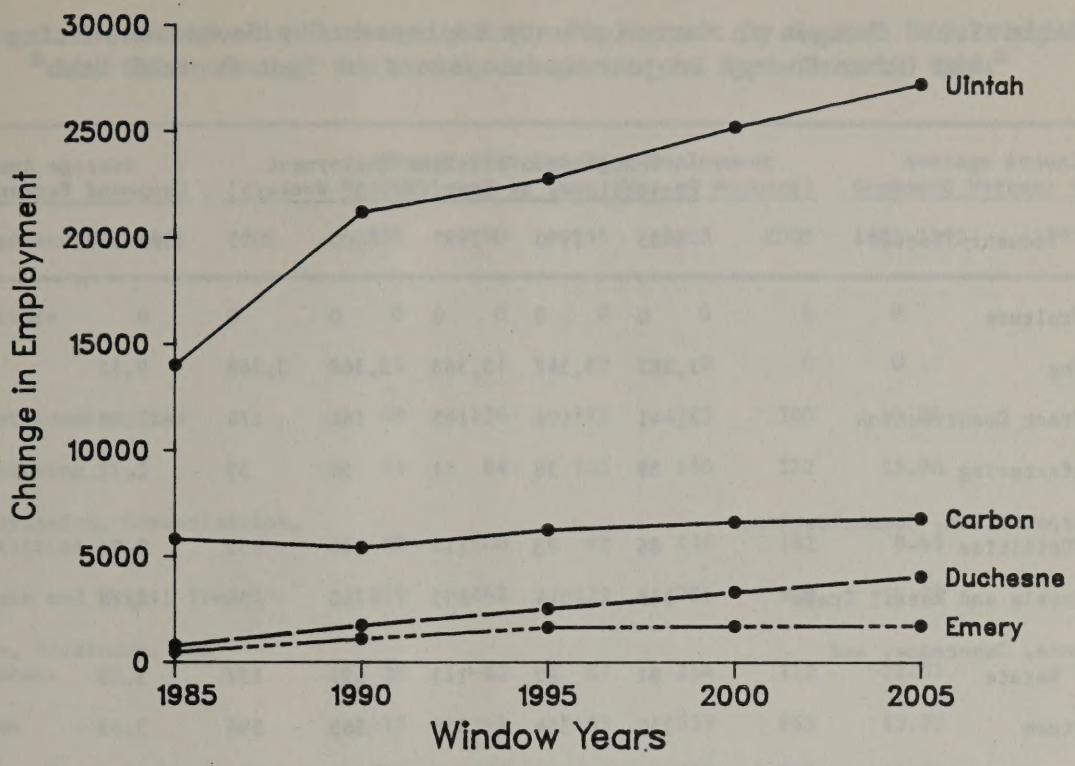

Fig. 5.2 Change in County Employment Levels Due to the Other Energy Projects

5.3.2.2 Employment Impacts by Industrial Sector

Table 5.11 illustrates that Carbon County would realize a significant increase in mining employment due to the development of the other energy projects. Most of the other energy projects planned for Carbon County are coal mine developments, either an expansion of existing activities or the opening of new mines (see Table 5.1). In 1985, employment in mining is projected to be 1,382 jobs above the baseline, while in 1995 through 2005, mining employment would be 3,368 jobs above the baseline projection. Contract construction is projected to decrease over the period, from 2,441 jobs above the baseline in 1985 to just 174 above in 2005. The decrease over the first 10 years is at a 27.08% annual rate. Most of the other employment sectors are projected to expand at a relatively equal rate of growth -- between 2.7% and 3.8% during the 1985-1995 period, and 1.4% to 1.8% in the 1995-2005 time frame. Relatively large increases are forecast in government employment and in trade, the second and third largest sectors, respectively.

Duchesne County is forecast to have very large increases in almost all employment sectors (Table 5.12). The agriculture and mining sectors are not expected to realize employment growth due to the development of the other energy projects. However, seven industrial sectors are forecast to have yearly employment increases of 10% or more from 1985 to 1995. The largest annual percentage increase would be in contract construction (16.01% annually,

Table 5.11 Changes in Carbon County Employment by Sector Resulting from the Other Energy Project Developments in East-Central Utah[a]

Industry Sector	Change from Baseline Employment Projections, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	0	0
Mining	1,382	3,342	3,368	3,368	3,368	9.32	0
Contract Construction	2,441	108	145	164	174	-27.08	1.84
Manufacturing	39	38	51	56	59	2.72	1.47
Transportation, Communication, and Utilities	86	83	114	126	132	2.86	1.48
Wholesale and Retail Trade	528	514	693	760	798	2.76	1.42
Finance, Insurance, and Real Estate	81	82	113	127	137	3.39	1.95
Services	350	354	500	565	596	3.63	1.77
Government	543	530	788	933	1,004	3.79	2.45
Nonfarm Proprietors	353	343	462	509	535	2.73	1.48
Total	5,803	5,394	6,234	6,608	6,803	0.72	0.88

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

1985-1995). The largest employment sector, however, is government, which would employ 1,214 additional workers in the year 2005. This would be 30% of the total additional employment projected for the county in that year. The next largest growth sectors are trade at 960 additional workers in 2005, and services at 655 additional workers in 2005.

Emery County is scheduled to realize relatively minor employment growth due to the other energy projects, when compared to the rest of the region. This is evident from the change in industrial sector and total employment presented in Table 5.13. Mining is the only sector in which substantial growth would occur. In 1985, mining employment would be 227 workers above the baseline, and in 1995 through 2005, employment is anticipated to be 1,198 workers above the baseline projections. This would translate into an 18.1% annual growth rate between 1985 and 1995. The next largest sector expected to grow is government, in which employment is forecast to be 165 workers above the baseline in 2005. This would be a 154% increase over the 1985 level of additional employment from other energy projects.

Table 5.12 Changes in Duchesne County Employment by Sector Resulting from the Other Energy Project Developments in East-Central Utah[a]

Industry Sector	Change from Baseline Employment Projections, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	0	0
Mining	1	1	0	0	0	0	0
Contract Construction	48	126	212	293	360	16.01	5.44
Manufacturing	24	64	105	140	172	15.90	5.06
Transportation, Communication, and Utilities	40	100	92	116	142	8.69	4.44
Wholesale and Retail Trade	223	462	629	781	960	10.93	4.32
Finance, Insurance, and Real Estate	29	62	87	114	113	11.61	2.65
Services	112	264	405	533	655	13.72	4.92
Government	239	483	727	988	1,214	11.77	5.26
Nonfarm Proprietors	73	176	271	356	437	14.02	4.89
Total	789	1,738	2,528	3,321	4,055	12.35	4.84

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

As indicated in the previous section, Uintah County would experience very rapid growth as a result of the other energy developments. Table 5.14 shows that in the period from 1985 to 1995, every sector except agriculture and contract construction would undergo annual employment growth of 11% or more. The largest percentage increases are expected for nonfarm proprietors (16.05% annually, 1985-1995) and mining (14.41% annually, 1985-1995). Mining would be by far the largest growth sector, employing an additional 14,002 miners above the baseline projections in 1995, 2000, and 2005. The mining employment in the year 2005 would be nearly six times greater (484% change) than the baseline projections, when the other energy projects are included in the sectoral total. Government would be the next largest sector projected to grow, followed by trade. Only one sector, contract construction, is expected to have employment reductions during the study period; employment declines from 8,179 workers above the baseline in 1985 to just 1,240 above in the year 2005.

Table 5.13 Changes in Emery County Employment by Sector Resulting from the Other Energy Project Developments in East-Central Utah[a]

Industry Sector	Change from Baseline Employment Projections, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	0	0
Mining	227	842	1,198	1,198	1,198	18.10	0
Contract Construction	18	18	31	34	36	5.59	1.51
Manufacturing	2	3	4	5	6	7.18	4.14
Transportation, Communication, and Utilities	16	18	28	31	33	5.76	1.66
Wholesale and Retail Trade	64	63	102	109	117	4.77	1.38
Finance, Insurance, and Real Estate	6	6	10	11	12	5.24	1.84
Services	33	31	51	55	59	4.45	1.47
Government	65	66	128	155	165	7.01	2.57
Nonfarm Proprietors	56	57	94	102	109	5.32	1.49
Total	487	1,104	1,646	1,700	1,735	12.95	0.53

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

5.3.2.3 Personal Income Impact Projections

The total personal income projections by county are presented in Table 5.15. These projections are based upon a forecast of per capita income and population growth. Per capita income for the years 1985-2005 was derived by aggregating the average monthly wage levels by industrial sector and assuming that (1) the personal income component would remain at the same proportion as the national level and (2) the average annual rate of growth would remain constant.

The per capita income levels for the region are shown in the first line of Table 5.15. Per capita income is projected to decline from $17,028 in 1985 to $13,584 in 1995 and then increase to $14,436 in 2005. The annual rate of decline in the first 10 years would be 2.23%, with a 0.61% increase in the final 10 years.

Total personal income in Carbon County is projected to grow at a 0.51% annual rate between 1985 and 1995 and then expand by 1.84% yearly in the 1995-2005 period. The rate of growth would be dampened somewhat because of

Table 5.14 Changes in Uintah County Employment by Sector Resulting from the Other Energy Project Developments in East-Central Utah[a]

Industry Sector	Change from Baseline Employment Projections, by Year (No. of Workers)					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Agriculture	0	0	0	0	0	0	0
Mining	3,643	11,256	14,002	14,002	14,002	14.41	0
Contract Construction	8,179	4,438	772	1,049	1,240	-21.02	4.85
Manufacturing	34	80	105	123	144	11.94	3.21
Transportation, Communication, and Utilities	117	412	443	528	625	14.24	3.50
Wholesale and Retail Trade	611	1,490	2,127	2,611	3,090	13.29	3.81
Finance, Insurance, and Real Estate	77	196	292	369	436	14.26	4.09
Services	427	1,037	1,480	1,831	2,167	13.24	3.89
Government	717	1,703	2,643	3,522	4,168	13.94	4.66
Nonfarm Proprietors	205	566	908	1,178	1,395	16.05	4.39
Total	14,010	21,178	22,772	25,213	27,267	4.98	1.82

[a]Totals may not add due to rounding.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

the decline in per capita income between 1985-1995. The level of additional personal income would be $228.46 million in 2005.

Duchesne County is anticipated to have the largest percentage increase in personal income among the four counties. Total personal income is forecast to expand by 7.08% annually between 1985 and 1995 and then slow to 3.99% annually for the 1995-2005 period. The level of total personal income in Duchesne County would be $247.82 million in the year 2005, as a result of the other energy projects proposed.

The change in total personal income in Emery County is projected to be the smallest of the four counties being analyzed. In 1985, the additional personal income, projected as a result of the other projects, would be $29.15 million. This income level would decline to $26.16 million in 1990 before it would increase to $48.61 million in 2005. The annual rate of change would be 3.24% for the 1985-1995 period and 1.94% thereafter.

Uintah County would realize the largest increase in personal income; ranging from $322.51 million in 1985 to $851.81 million in 2005. The large

Table 5.15 Total Personal Income and Per Capita Income Projections by County - Other Energy Projects

County Population and Income Category	Income and Population, by Year					Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-1995	1995-2005
Per Capita Income (1980 $)	17,028	15,192	13,584	13,800	14,436	-2.23	0.61
Change from Baseline, Carbon County							
Population	10,627	10,502	14,018	15,342	15,826	2.81	1.22
Total Personal Income (1980 $ x 10^6)	180.96	159.55	190.42	211.72	228.46	0.51	1.84
Change from Baseline, Duchesne County							
Population	4,965	9,542	12,333	14,910	17,167	9.53	3.36
Total Personal Income (1980 $ x 10^6)	84.54	144.96	167.53	205.76	247.82	7.08	3.99
Change from Baseline, Emery County							
Population	1,712	1,722	2,952	3,176	3,367	5.60	1.32
Total Personal Income (1980 $ x 10^6)	29.15	26.16	40.10	43.83	48.61	3.24	1.94
Change from Baseline, Uintah County							
Population	18,940	34,690	44,174	52,445	59,006	8.84	2.94
Total Personal Income (1980 $ x 10^6)	322.51	527.01	600.06	723.74	851.81	6.41	3.57

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

population growth forecast for Uintah County would overshadow the decline in per capita income during the 1985-1995 period by having total personal income increase throughout this period at a 6.41% annual rate. The 1995-2005 period would expand at a slightly slower rate, 3.57% annually.

5.3.3 Public and Private Infrastructure Effects

In addition to the effects of the other energy project developments on population, employment and income, there would also be a noticeable impact on the public and private infrastructure of the counties and communities in east-central Utah. The annual growth rate for infrastructure service demands are presented in Table 5.16 for each county. The magnitude and duration of impact by infrastructure category is illustrated in Tables 5.17-5.20.

Table 5.16 Infrastructure Service Demand Growth Factors Precipitated by the Development of the Other Energy Projects in East-Central Utah

Infrastructure Category	Cumulative Growth Factors, 1985-2005[a]			
	Carbon	Duchesne	Emery	Uintah
Housing				
Single family units	1	3	2	3
Multifamily units	1	3	2	3
Mobile homes	1	3	2	3
Education				
Students	3	6	3	7
Classrooms	2	6	3	7
Teachers	2	6	3	7
Health Care				
Hospital beds				
General care	2	3	3	3
Long-term care	3	9	3	8
Medical personnel				
Doctors	2	3	2	3
Dentists	2	3	2	3
Nurses	2	4	2	3
Public health nurses	2	3	-[b]	3
Mental health care				
Clinical psychologists	0	-[b]	-[b]	3
Mental health workers	2	2	-[b]	3
Public Safety				
Law enforcement				
Police officers	2	3	2	3
Patrol cars	2	3	2	3
Jail floor space	1	3	2	3
Juvenile holding cells	2	2	-[b]	2
Fire Protection				
Water flow				
Emergency Medical Service				
Ambulances	2	3	-[b]	3
Emergency medical technicians	2	3	-[b]	3

Table 5.16 (Cont'd)

Infrastructure Category	Cumulative Growth Factors, 1985-2005[a]			
	Carbon	Duchesne	Emery	Uintah
Utility Service Demands				
Water system				
Connections	1	3	2	3
Supply capacity	1	3	2	3
Storage capacity	1	3	2	3
Treatment capacity	1	3	2	3
Sewage system capacity	1	3	2	3
Other Services				
Park land area	1	4	2	3
Libraries				
Books	1	3	2	3
Floor space	1	3	2	3

[a]Computed as the ratio between 1985 and 2005.

[b]Undefined.

5.3.3.1 Rate of Change in Other Energy Project Infrastructure Demands

The following section describes the annual rate of growth projected to be incurred by each infrastructure category. Housing is dealt with in more detail because community and CCD impacts are included in the analysis. Table C.3 in Appendix C presents the change in housing demand by community and CCD.

In 1985, there would be a need for 11,019 additional housing units in the four-county region. Of these, 6,612 would be single family units, 1,653 multifamily units, and 2,755 mobile homes or trailers. In the year 2005, this region is projected to require 27,132 additional housing units. This demand would comprise 16,280 single family units, 4,070 multifamily units, and 6,783 mobile homes or trailers. A discussion of the demands by county and community follows.

Carbon County is projected to have the slowest increase in housing demand in the region. Housing demand from the other energy projects would increase by only 20% over the 20 years studied. Two of the three Census County Divisions (CCDs) in the county would actually experience a decline in

Table 5.17 Summary of the Changes in the Carbon County Infrastructure Service Demands Resulting from the Development of Other Energy Projects in East-Central Utah[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,290	2,318	64.2	2,126	2,000	48.5	2,396	2,541	51.5	2,528	2,623	50.9	2,636	2,792	51.4
Multifamily	323	580	64.2	532	500	48.4	599	635	51.5	632	656	50.9	659	698	51.4
Mobile homes	538	966	64.2	886	834	48.4	998	1,059	51.5	1,053	1,093	50.9	1,098	1,164	51.4
Education															
Students	1,924	2,017	51.2	3,824	2,052	34.9	4,824	3,679	43.3	4,624	4,790	50.9	4,724	5,307	51.6
Classrooms	77	81	51.3	153	82	34.9	193	147	43.2	185	192	50.9	189	202	51.7
Teachers	77	81	51.3	153	82	34.9	193	147	43.2	185	192	50.9	189	202	51.7
Health Care															
Hospital beds															
General care	15	21	58.3	25	21	45.7	29	28	49.1	30	31	50.8	31	32	50.8
Long-term care	23	9	28.1	39	19	32.8	39	23	37.1	39	24	38.1	43	25	36.8
Medical personnel															
Doctors	5	6	54.5	8	6	42.9	9	8	47.1	9	9	50.0	10	10	50.0
Dentists	4	5	55.6	7	5	41.7	8	7	46.7	8	8	50.0	8	8	50.0
Nurses	13	18	58.1	21	18	46.2	25	24	49.0	25	26	51.0	26	27	50.9
Public health nurses	2	2	50.0	3	2	40.0	3	3	50.0	3	3	50.0	4	3	42.9
Mental health care															
Clinical psychologists	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	2	1	33.3	2	1	33.3	2	2	50.0	2	2	50.0
Public Safety															
Law enforcement															
Police officers	15	21	58.3	25	21	45.7	29	28	49.1	30	31	50.8	31	32	50.8
Patrol cars	15	21	58.3	25	21	45.7	29	28	49.1	30	31	50.8	31	32	50.8
Jail space (sq ft)	3,703	5,314	58.9	6,161	5,251	46.0	7,161	7,009	49.5	7,306	7,671	51.2	7,551	7,671	50.4
Juvenile holding cells	1	1	50.0	2	1	33.3	2	2	50.0	2	2	50.0	2	2	50.0
Fire Protection															
Water flow (gpm)/ duration (hr)	3,000/ 10	3,000/ 10	50.0	3,000/ 10	3,000/ 10	50.0	3,000/ 10	3,500/ 10	53.8	3,000/ 10	4,000/ 10	57.1	3,000/ 10	4,000/ 10	57.1
Emergency Medical Service															
Ambulances	2	2	50.0	3	2	40.0	3	3	50.0	3	3	50.0	4	3	42.9
Emergency medical technicians	14	14	50.0	21	14	40.0	21	21	50.0	21	21	50.0	28	21	42.9
Utility Service Demands															
Water system															
Connections	2,390	3,428	58.9	3,975	3,388	46.0	4,620	4,522	49.5	4,714	4,949	51.2	4,872	5,106	51.2
Supply (10^6 gal/d)	3.8	5.5	59.1	6.4	5.4	45.8	7.4	7.2	49.3	7.5	7.9	51.3	7.8	8.2	51.3
Storage (10^6 gal/d)	1.9	2.7	58.7	3.2	2.7	45.8	3.7	3.7	50.0	3.8	4.0	51.3	3.9	4.1	51.3
Treatment (10^6 gal/d)	3.8	5.5	59.1	6.4	5.4	45.8	7.4	7.2	49.3	7.5	7.9	51.3	7.8	8.2	51.3
Sewage system (10^6 gal/d)	0.7	1.1	61.1	1.2	1.0	45.5	1.4	1.4	50.0	1.5	1.5	50.0	1.5	1.6	51.6
Other Services															
Parks (acres)	45	64	58.7	74	63	46.0	86	84	49.4	88	92	51.1	91	95	51.1
Libraries															
Books	14,812	21,254	58.9	24,642	21,004	46.0	28,642	28,036	49.5	29,222	30,684	51.2	30,202	31,652	51.2
Space (sq ft)	3,703	5,314	58.9	6,161	5,251	46.0	7,161	7,009	49.5	7,306	7,671	51.2	7,551	7,913	51.2

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 5.18 Summary of the Changes in the Duchesne County Infrastructure Service Demands Resulting from the Development of Other Energy Projects in East-Central Utah[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,007	1,010	50.1	1,072	1,825	63.0	1,055	2,168	67.3	1,088	2,540	70.0	1,139	2,925	72.0
Multifamily	252	252	50.0	268	456	63.0	264	542	67.3	273	635	69.9	285	731	71.9
Mobile homes	420	421	50.1	447	761	63.0	439	904	67.3	454	1,059	70.0	475	1,219	72.0
Education															
Students	1,254	989	44.1	1,924	1,858	49.1	2,244	3,160	58.5	1,824	4,632	71.7	1,724	5,941	77.5
Classrooms	51	40	44.0	77	74	49.0	90	126	58.3	73	185	71.7	69	238	77.5
Teachers	51	40	44.0	77	74	49.0	90	126	58.3	73	185	71.7	69	238	77.5
Health Care															
Hospital beds															
General care	11	10	47.6	13	19	59.4	13	25	65.8	12	30	71.4	11	34	75.6
Long-term care	6	1	14.3	9	3	25.0	14	7	33.3	18	8	30.8	24	9	27.3
Medical personnel															
Doctors	4	3	42.9	4	6	60.0	4	7	63.6	4	9	69.2	4	10	71.4
Dentists	3	3	50.0	4	5	55.6	4	6	60.0	3	8	72.7	3	9	75.0
Nurses	9	8	47.1	11	16	59.3	11	21	65.6	10	25	71.4	10	29	74.4
Public health nurses	2	1	33.3	2	2	50.0	2	3	60.0	2	3	60.0	2	3	60.0
Mental health care															
Clinical psychologists	1	1	1	1	1	50.0	1	1	50.0	1	1	50.0	1	1	50.0
Mental health workers	1	1	50.0	1	1	50.0	1	1	50.0	1	2	66.7	1	2	66.7
Public Safety															
Law enforcement															
Police officers	11	10	47.6	13	19	59.4	13	25	65.8	12	30	71.4	11	34	75.6
Patrol cars	11	10	47.6	13	19	59.4	13	25	65.8	12	30	71.4	11	34	75.6
Jail space (sq ft)	2,608	2,483	48.8	3,058	4,771	60.9	3,058	6,166	66.8	2,863	7,455	72.3	2,703	8,584	76.1
Juvenile holding cells	1	1	50.0	1	1	50.0	1	2	66.7	1	2	66.7	1	2	66.7
Fire Protection															
Water flow (gpm)/ duration (hr)	2,500/ 10	2,250/ 9	47.4	3,000/ 10	3,000/ 10	50.0	3,000/ 10	3,500/ 10	53.8	2,500/ 10	3,500/ 10	58.3	2,500/ 10	4,000/ 10	61.5
Emergency Medical Service															
Ambulances	2	1	33.3	2	2	50.0	2	3	60.0	2	3	60.0	2	3	60.0
Emergency medical technicians	14	7	33.3	14	14	50.0	14	21	60.0	14	21	60.0	14	21	60.0
Utility Service Demands															
Water system															
Connections	1,683	1,602	48.8	1,973	3,078	60.9	1,973	3,979	66.9	1,847	4,810	72.3	1,744	5,538	76.1
Supply (10^6 gal/d)	2.7	2.6	49.1	3.1	4.9	61.3	3.2	6.4	66.7	3.0	7.7	72.0	2.8	8.9	76.1
Storage (10^6 gal/d)	1.3	1.3	50.0	1.6	2.5	61.0	1.6	3.2	66.7	1.5	3.8	71.7	1.4	4.4	75.9
Treatment (10^6 gal/d)	2.7	2.6	49.1	3.1	4.9	61.3	3.2	6.4	66.7	3.0	7.7	72.0	2.8	8.9	76.1
Sewage system (10^6 gal/d)	0.5	0.5	50.0	0.6	1.0	62.5	0.6	1.2	66.7	0.6	1.5	71.4	0.5	1.7	77.3
Other Services															
Parks (acres)	32	28	46.7	37	57	60.6	37	74	66.7	35	89	71.8	33	103	75.7
Libraries															
Books	10,430	9,930	48.8	12,230	19,084	60.9	12,230	24,666	66.9	11,450	29,820	72.3	10,810	34,334	76.1
Space (sq ft)	2,608	2,483	48.8	3,058	4,771	60.9	3,058	6,167	66.9	2,863	7,455	72.3	2,703	8,584	76.1

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 5.19 Summary of the Changes in the Emery County Infrastructure Service Demands Resulting from the Development of Other Energy Projects in East-Central Utah[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	382	374	49.5	448	328	42.3	472	535	53.1	448	545	54.9	412	561	56.9
Multifamily	96	93	49.2	112	82	42.3	118	134	53.2	112	136	54.8	103	140	56.9
Mobile homes	159	156	49.5	187	137	42.3	197	223	53.1	187	227	54.8	172	235	56.9
Education															
Students	816	303	27.1	1,416	336	19.2	1,716	779	31.2	1,516	1,000	39.7	1,516	1,045	40.8
Classrooms	33	12	26.7	57	13	18.6	69	31	31.0	61	40	39.6	61	42	40.8
Teachers	33	12	26.7	57	13	18.6	69	31	31.0	61	40	39.6	61	42	40.8
Health Care															
Hospital beds															
General care	6	3	33.3	7	3	30.0	8	6	42.9	7	6	46.2	7	7	50.0
Long-term care	6	2	25.0	6	3	33.3	6	5	45.5	4	5	55.6	4	5	55.6
Medical personnel															
Doctors	2	1	33.3	3	1	25.0	3	2	40.0	2	2	50.0	2	2	50.0
Dentists	2	1	33.3	2	1	33.3	2	2	50.0	2	2	50.0	2	2	50.0
Nurses	5	3	37.5	6	3	33.3	7	5	41.7	6	5	45.5	6	6	50.0
Public health nurses	1	1	1	1	1	1	1	1	50.0	1	1	50.0	1	1	50.0
Mental health care															
Clinical psychologists	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mental health workers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Public Safety															
Law enforcement															
Police officers	6	3	33.3	7	3	30.0	8	6	42.9	7	6	46.2	7	7	50.0
Patrol cars	6	3	33.3	7	3	30.0	8	6	42.9	7	6	46.2	7	7	50.0
Jail space (sq ft)	1,305	856	39.6	1,695	861	33.7	1,815	1,476	44.8	1,640	1,588	49.2	1,550	1,634	51.3
Juvenile holding cells	1	1	1	1	1	1	1	1	1	1	-[b]	-[b]	1	1	1
Fire Protection															
Water flow (gpm)/ duration (hr)	1,750/ 7	1,250/ 5	41.7	2,000/ 8	1,250/ 5	38.5	2,000/ 8	1,750/ 7	46.7	2,000/ 8	1,750/ 7	46.7	2,000/ 8	1,750/ 7	46.7
Emergency Medical Service															
Ambulances	1	1	1	1	1	1	1	1	50.0	1	1	50.0	1	1	50.0
Emergency medical technicians	7	1	1	7	1	1	7	7	50.0	7	7	50.0	7	7	50.0
Utility Service Demands															
Water system															
Connections	842	552	39.6	1,094	556	33.7	1,171	952	44.8	1,058	1,025	49.2	1,000	1,054	51.3
Supply (10^6 gal/d)	1.3	0.9	40.9	1.8	0.9	33.3	1.9	1.5	44.1	1.7	1.6	48.5	1.6	1.7	51.5
Storage (10^6 gal/d)	0.7	0.4	36.4	0.9	0.4	30.8	0.9	0.8	47.1	0.8	0.8	50.0	0.8	0.8	50.0
Treatment (10^6 gal/d)	1.3	0.9	40.9	1.8	0.9	33.3	1.9	1.5	44.1	1.7	1.6	48.5	1.6	1.7	51.5
Sewage system (10^6 gal/d)	0.3	0.2	40.0	0.3	0.2	40.0	0.4	0.3	42.9	0.3	0.3	50.0	0.3	0.3	50.0
Other Services															
Parks (acres)	16	10	38.5	21	10	32.3	22	18	45.0	20	19	48.7	19	20	51.3
Libraries															
Books	5,218	3,424	39.6	6,778	3,444	33.7	7,258	5,904	44.9	6,558	6,352	49.2	6,198	6,534	51.3
Space (sq ft)	1,305	856	39.6	1,695	861	33.7	1,815	1,476	44.8	1,640	1,588	49.2	1,550	1,634	51.3

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

Table 5.20 Summary of the Changes in the Uintah County Infrastructure Service Demands Resulting from the Development of Other Energy Projects in East-Central Utah[a]

County/Service Category	1985			1990			1995			2000			2005		
	Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects		Projected Baseline Demand Increment[b]	Other Projects	
		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total		Change in Demand	% of Total
Housing units															
Single family	1,014	2,909	74.2	1,502	6,316	80.8	1,560	7,723	83.2	1,566	8,886	85.0	1,608	10,001	86.1
Multifamily	254	727	74.1	378	1,579	80.7	390	1,931	83.2	392	2,222	85.0	402	2,500	86.1
Mobile homes	423	1,212	74.1	630	2,632	80.7	650	3,218	83.2	653	3,703	85.0	670	4,167	86.1
Education															
Students	1,400	2,849	67.1	3,010	6,411	68.1	3,770	11,259	74.9	3,020	16,205	84.3	2,790	20,485	88.0
Classrooms	56	114	67.1	121	256	67.9	151	450	74.9	121	648	84.3	112	819	88.0
Teachers	56	114	67.1	121	256	67.9	151	450	74.9	121	648	84.3	112	819	88.0
Health Care															
Hospital beds															
General care	11	38	77.6	18	69	79.3	19	88	82.2	17	105	86.1	16	118	88.1
Long-term care	10	4	28.6	21	10	32.3	29	24	45.3	35	29	45.3	42	32	43.2
Medical personnel															
Doctors	4	11	73.3	6	21	77.8	6	27	81.8	6	32	84.2	5	35	87.5
Dentists	3	10	76.9	5	17	77.3	5	22	81.5	5	26	83.9	4	30	88.2
Nurses	9	32	78.0	15	59	79.7	16	75	82.4	15	89	85.6	14	100	87.7
Public health nurses	2	4	66.7	2	7	77.8	2	9	81.8	2	11	84.6	2	12	85.7
Mental health care															
Clinical psychologists	1	1	50.0	1	2	66.7	1	2	66.7	1	3	75.0	1	3	75.0
Mental health workers	1	2	66.7	1	4	80.0	1	4	80.0	1	5	83.3	1	6	85.7
Public Safety															
Law enforcement															
Police officers	11	38	77.6	18	70	79.5	19	88	82.2	17	105	86.1	16	118	88.1
Patrol cars	11	38	77.6	18	70	79.5	19	88	82.2	17	105	86.1	16	118	88.1
Jail space (sq ft)	2,602	9,470	78.4	4,402	17,480	79.9	4,672	22,087	82.5	4,232	26,223	86.1	3,842	29,503	88.5
Juvenile holding cells	1	3	75.0	2	5	71.4	2	6	75.0	2	7	77.8	1	8	88.9
Fire Protection															
Water flow (gpm)/ duration (hr)	2,500/ 10	4,000/ 10	61.5	3,000/ 10	5,500/ 10	64.7	3,000/ 10	6,000/ 10	66.7	3,000/ 10	7,000/ 10	70.0	3,000/ 10	7,000/ 10	70.0
Emergency Medical Service															
Ambulances	2	4	66.7	2	7	77.8	2	9	81.8	2	11	84.6	2	12	85.7
Emergency medical technicians	14	28	66.7	14	49	77.8	14	63	81.8	14	77	84.6	14	84	85.7
Utility Service Demands															
Water system															
Connections	1,679	6,110	78.4	2,841	11,191	79.8	3,015	14,251	82.5	2,731	16,919	86.1	2,479	19,035	88.5
Supply (10^6 gal/d)	2.7	9.8	78.4	4.5	17.9	79.9	4.8	22.8	82.6	4.4	27.1	86.0	4.0	30.5	88.4
Storage (10^6 gal/d)	1.3	4.4	79.0	2.3	9.0	79.6	2.4	11.4	82.6	2.2	13.6	86.1	2.0	15.2	88.4
Treatment (10^6 gal/d)	2.7	9.8	78.4	4.5	17.9	79.9	4.8	22.8	82.6	4.4	27.1	86.0	4.0	30.5	88.4
Sewage system (10^6 gal/d)	0.5	1.7	77.3	0.9	3.5	79.5	0.9	4.4	83.0	0.8	5.2	86.7	0.8	5.9	88.1
Other Services															
Parks (acres)	32	114	78.1	53	208	79.7	57	265	82.3	51	315	86.1	47	354	88.3
Libraries															
Books	10,408	37,880	78.4	17,608	69,380	79.8	18,688	88,348	82.5	16,928	104,890	86.1	15,368	118,012	88.5
Space (sq ft)	2,602	9,470	78.4	4,402	17,345	79.8	4,672	22,087	82.5	4,232	26,223	86.1	3,842	29,503	88.5

[a]Developed from guidelines prepared by the Department of Community and Economic Development, State of Utah and population projections from the UPED Model Output, Utah State Planning Coordinators Office (June 1983). See Appendix A for service standard guidelines.

[b]Numbers represent service demands required to satisfy the post-1980 baseline population growth regardless of 1980 operating conditions.

additional housing demand over the 1985-2005 period; Helper and East Carbon CCDs. Only the Price CCD would realize a steady growth in housing demand, with demand increasing by 53% between 1985 to 2005. The city of Price is forecast to have the greatest level of housing demand in the county (2,421 additional units by 2005), and the greatest increase in demand over the period (53.3% from 1985 to 2005). The unincorporated area in the Price CCD would also grow rapidly (53% increase, 1985-2005).

In Duchesne County, the housing demand from the other energy projects is concentrated in the Roosevelt CCD. Countywide, there would be a 190% increase in housing demand over the 20 years studied. Housing demand in the Roosevelt CCD is projected to be nearly three times the 1985 level. The city of Roosevelt would absorb the greatest amount of this housing demand growth in the CCD. In the year 2005, 3,336 additional units would be required in Roosevelt. The unincorporated area in the Roosevelt CCD would also grow substantially, as 1,260 additional units would be required in the year 2005.

Housing demand in Emery County is projected to increase by 50% from 1985 to 2005 due to the other energy projects. Emery would have the smallest demand for housing relative to the counties throughout the period; only 935 additional units are estimated to be required in the year 2005. The most dramatic increase in housing demand within Emery County would occur in the Emery-Ferron CCD where demand in 2005 would be 330% greater than in 1985 (i.e., nearly 4.5 times the 1985 level of demand). Because of the number of housing units involved, the absolute change is not as significant as the percentage change when compared to growth in other areas of the county. There would be a sharp decrease in housing demand over the 20 year period in the Green River CCD. In this CCD, new housing demand would drop by 68% between 1985 and 2005, with the largest decreases projected to occur in the city of Green River. Within the Castle Dale-Huntington CCD a moderate increase in housing demand is forecast. The city of Castle Dale would have the greatest proportion requiring 229 additional units in 2005.

Because of its large population and employment growth projections, Uintah County would have the greatest new demand for housing units throughout the period. By the year 2005, 16,668 additional units would be required to satisfy the demand created by the other energy projects. This would be equivalent to a 244% increase in demand between 1985 and 2005. The Vernal CCD is projected to be the fastest growing area in the county, since demand would increase by 250% over the study period. The city of Vernal would require an additional 7,123 units by 2005. This level of housing demand would be the greatest within the whole region. Naples would also grow rapidly, as there is expected to be a need for 3,288 additional units by 2005. The unincorporated areas in the Vernal CCD would also realize comparable increases in housing demand. In the Uintah-Ouray CCD, 314 additional housing units would be needed by 2005 to satisfy the population growth demands from the other projects.

Education is projected to incur the greatest percentage increase in demand of all the infrastructure categories considered (Table 5.16).

Increases between 1985 and 2005 are projected to range from 2.5 times the 1985 level in Carbon County to more than a sevenfold increase in Uintah County.

Substantial percentage increases would also occur regarding the health care services requirements. Duchesne, Emery, and Uintah counties would all have to increase the number of general care hospital beds by at least 200% to satisfy the other energy projects demand. There would need to be nine times as many long-term care beds in Duchesne County in 2005 as in 1985, and eight times as many in Uintah County. In the other two counties, increases in the number of hospital beds required would be less than 200%. The number of medical personnel would need to increase in each county. In Carbon County, the number of additional doctors, dentists, and nurses required range from 50% to 67%. In Uintah and Duchesne, the additional medical personnel required between 1985 and 2005 would more than double. The number of mental health care workers required would not increase as rapidly as that of the medical profession.

Percentage increases in public safety requirements would be of a lower magnitude than for education or health care. Police officers and patrol cars are projected to increase by more than threefold in Uintah and Duchesne counties and by 50% in Carbon County. Similar changes in demand would occur in the amount of additional jail space required to satisfy the growth induced by the other energy projects. Fire protection would also need to expand; increases in the indicator of fire protection, fire flow, are projected to expand by less than twofold in all four counties. There would need to be a 200% increase in emergency medical services in Duchesne and Uintah counties, with a 50% increase in Carbon County.

Utility service demands, including all water system components and the sewage system, would need to increase by 49% in Carbon County and by 90% in Emery. Duchesne and Uintah counties would require these utility services to grow to a level three times greater in 2005 than would be demanded in 1985 by the other energy project population.

In each county, the degree of change for the park and library services is similar to that required for the public utilities.

5.3.3.2 Magnitude of Impact Caused by Other Energy Project Infrastructure Demands

In Carbon County the change in infrastructure service demands caused by the other energy projects would account for between 40% and 64% of the total new demand (baseline and other projects) for each service category. The service demands attributable to the baseline growth and the other energy projects proposed for development are presented in Table 5.17. The third column of every window year presents the proportion of the total new service demand that is required for the growth created by the other energy projects.

In 1985, the other energy projects would generate 64.2% of the housing demand in Carbon County, and between 50% and 61% for most other categories. In 1990 and 1995, however, the additional demand created by these other projects would make up less than 50% of the new service demands in nearly every category. Then by the years 2000 and 2005, the demand created by the other projects would again make up over half of the total services required in all but one category. The new infrastructure demands created by the other energy projects would not exceed 60% of the total service requirements, except for housing in 1985.

The impact of the other energy projects would grow steadily from 1985 to 2005 in Duchesne County. In 1985, the other energy projects would account for between 30% and 50% of the total new service demands in each category. In almost all categories, the proportion would be between 48% and 50%. By the year 2005, the demand caused by the other energy projects would make up between 60% and 77% of the total new service demands in all but two categories (beds for long-term care, and clinical psychologists). Education is projected to have the highest percentage of new service demands attributable to the other energy projects in the year 2005, 77.5% of the total.

Emery and Carbon counties are expected to have a similar magnitude and distribution of impact. In 1985, the other energy projects would account for between 25% and 50% of the total service demands in Emery County. The percentages for most categories would decline in 1990, before they would increase again in 1995, 2000, and 2005. By the year 2005, the other energy projects would create at least 50% of the demand in every category except education and fire protection. The increase in the demand for housing in 2005 would be the service category most affected by the other energy projects (56.9% of the total).

Uintah County would undergo the greatest amount of change in the four counties as a result of the other energy developments. In 1985, these energy projects are estimated to create from 50% to 79% of the total infrastructure service demands in all but one category (long-term health care beds). In 1985, around 78% of the new utility services required would be the result of these other energy projects. The proportions increase throughout the study period. In the year 2005, the service demands of all categories caused by the other energy projects would be at least 85% of the total in all but a few categories.

5.3.4 Indian Reservation Impacts

The impacts on the Uintah-Ouray Indian Reservation have already been included in the county and CCD totals presented in Sec. 5.3.3. The impacts which are specific to the reservation are discussed in the following section. The population and household impacts are separated from the county and CCD totals presented earlier. Only population and housing impacts on the reservation will be discussed, due to the fact that the UPED model did not

provide employment and personal income figures for such a detailed geographic level. A sufficient data base was also unavailable to make public and private infrastructure projections. Total demands of the counties and CCDs involved do include the impacts which could occur in these categories on the reservation.

The Ute tribe conducted a survey of the attitudes of its members regarding possible energy developments in the Uintah Basin. The results showed that the Utes had many of the same concerns as non-Indians regarding energy development in this area. Most were concerned that their wilderness areas would be ruined, especially the Hill Creek extension. They were also alarmed about the possibility of increased pollution and an overextension of public services. They were, however, favorable toward the prospect that the energy developments are expected to increase employment opportunities, stimulate the economy and encourage young people to stay on the reservation.

Impacts on the reservation due to the development of other energy projects are projected to be quite substantial. Population growth is forecast to increase steadily throughout the period, reaching 4,561 people above the baseline in the year 2005. Between 1985 and 1995, the reservation population due to the other energy projects is projected to increase at a 9.25% annual growth rate, while from 1995-2005 the rate of growth would be 3.04% annually. The total percentage change in other project-related population is forecast to be approximately 227%. Table 5.21 displays the population and household impacts by year. The number of additional households would expand from 481 to 1,296, or by 170% due to the other energy projects. This growth corresponds to a 7.54% annual rate of change between 1985 and 1995 and 2.68% annually thereafter until 2005.

The population resulting from the other energy projects would account for between 34% and 59% of the total growth in population on the reservation.

Table 5.21 Summary of Socioeconomic Impacts on the Uintah-Ouray Indian Reservation[a] by Category and Window Years for Other Energy Projects

Socioeconomic Development Category	Change from Baseline, by Year					Percent Change	Average Annual Compound Percent Change	
	1985	1990	1995	2000	2005	1985-2005	1985-1995	1995-2005
Population	1,396	2,668	3,382	4,035	4,561	226.7	9.25	3.04
Households	481	852	995	1,147	1,296	169.4	7.54	2.68

[a]Reservation is defined as the unincorporated portions of the Roosevelt and the Uintah and Ouray Census County Divisions.

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

Table 5.22 presents the population and household growth by window year and growth stimulus. The growth in the number of households is expected to follow much the same pattern as that of population. The other energy projects would produce 481 more households in 1985, and 1,296 more in 2005. This growth would represent between 22% and 40% of the total household growth on the reservation.

Table 5.22 Comparison of Population and Household Impacts on the Reservation -- Other Energy Projects and Baseline Projections

Year and Cause of Change	Socioeconomic Development Category	
	Population Growth	Household Growth
1985		
Projected Baseline Increment	2,667	1,690
Other Projects		
Number	1,396	481
Percent of Total	34.4	22.2
1990		
Projected Baseline Increment	3,773	1,938
Other Projects		
Number	2,668	852
Percent of Total	41.4	30.5
1995		
Projected Baseline Increment	3,766	1,904
Other Projects		
Number	3,382	995
Percent of Total	47.3	34.3
2000		
Projected Baseline Increment	3,455	1,930
Other Projects		
Number	4,035	1,147
Percent of Total	53.9	37.3
2005		
Projected Baseline Increment	3,197	1,973
Other Projects		
Number	4,561	1,296
Percent of Total	58.8	39.6

Source: adapted from UPED Model Output, Utah State Planning Coordinators Office (June 1983).

6 SUMMARY AND COMPARISON OF CUMULATIVE IMPACTS

This section depicts, through various means, the cumulative impacts of the high and low commercial development scenarios relative to the baseline projections. Included in the cumulative impacts are the effects of the other energy projects, to account for the simultaneous population and employment growth that would arise. Hereafter, the term cumulative scenario impacts will be used and should be interpreted as the impacts from the high or low commercial scenario together with the other energy projects.

The baseline projections of population and employment are the actual levels that would be realized in the five window years. Conversely, the employment and population figures for the high and low commercial development scenarios and the other energy projects reflect the change from baseline conditions.

6.1 TOTAL POPULATION IMPACTS BY COUNTY AND GROWTH STIMULI

The total population impacts projected to potentially occur under the different growth stimuli -- high and low commercial development scenarios, other energy projects, and projected baseline -- are displayed in Tables 6.1-6.3. Table 6.1 indicates the actual level of population impact; population by growth stimulus is presented as a change from the projected baseline population. In other words, the population impacts shown by growth stimuli correspond to the increment over the baseline directly attributable to proposed developments. Figure 6.1 further depicts the impacts of the growth stimuli by presenting the cumulative effects of each individually. Table 6.2 then illustrates the proportional effects of the high and low cumulative scenario totals. Finally, Table 6.3 presents the average annual growth rates by county and time period for the population attributable to the high and low cumulative scenarios.

The baseline projections presented in Table 6.1 alone predict that Carbon County would remain the largest county throughout the 1985-2005 period, and that Uintah County would be the second largest in terms of population. Population in Garfield, Grand, and Wayne counties would not be expected to reach 10,000 people under the baseline projections. When the impacts of the proposed energy developments in the area are considered, Uintah is projected to become the largest county, surpassing Carbon County in the first window year (1985). No other county is projected to grow to half the size of either Carbon or Uintah County. A discussion of the county-by-county trends is presented below.

Table 6.1 Total Population Impact by County and Growth Stimuli (1985-2005)

County and Window Year	Projected Baseline (1)	Change from Baseline Population, by Year: High Commercial Scenario (2)	Low Commercial Scenario (3)	Other Energy Projects (4)	High Cumulative Total (2+4)	Low Cumulative Total (3+4)
Carbon County						
1985	29,590	76	76	10,629	10,705	10,705
1990	34,500	11,217	2,895	10,497	21,714	13,392
1995	36,500	15,503	6,677	14,019	29,522	20,696
2000	36,790	18,563	8,811	15,342	33,905	24,153
2005	37,280	25,649	9,137	15,754	41,403	24,891
Duchesne County						
1985	17,780	0	97	4,965	4,965	5,062
1990	18,640	798	311	9,542	10,340	9,853
1995	18,680	1,604	372	12,333	13,937	12,705
2000	18,300	1,127	423	14,910	16,037	15,333
2005	17,970	1,124	433	17,167	18,291	17,600
Emery County						
1985	14,060	12	12	1,713	1,725	1,725
1990	14,840	1,891	747	1,723	3,614	2,470
1995	15,080	10,813	1,731	2,953	13,766	4,684
2000	14,730	3,913	1,151	3,176	7,089	4,327
2005	14,550	4,319	1,193	3,265	7,584	4,458
Garfield County						
1985	4,300	0	0	0	0	0
1990	4,600	292	29	0	292	29
1995	4,800	1,212	114	0	1,212	114
2000	4,990	1,390	124	0	1,390	124
2005	5,210	1,466	129	0	1,466	129
Grand County						
1985	7,800	125	125	0	125	125
1990	8,250	2,345	2,559	0	2,345	2,559
1995	8,460	15,383	2,878	0	15,383	2,878
2000	8,330	7,556	2,477	0	7,556	2,477
2005	8,500	7,997	2,569	0	7,997	2,569
Uintah County						
1985	25,720	0	164	18,940	18,940	19,104
1990	29,310	1,565	588	34,690	36,255	35,278
1995	29,850	3,062	689	44,174	47,236	44,863
2000	28,970	2,040	771	52,445	54,485	53,216
2005	28,200	2,033	787	59,006	61,039	59,793
Wayne County						
1985	2,130	0	0	0	0	0
1990	2,340	159	159	0	159	159
1995	2,570	5,514	1,076	0	5,514	1,076
2000	2,740	2,780	758	0	2,780	758
2005	2,930	3,093	786	0	3,093	786

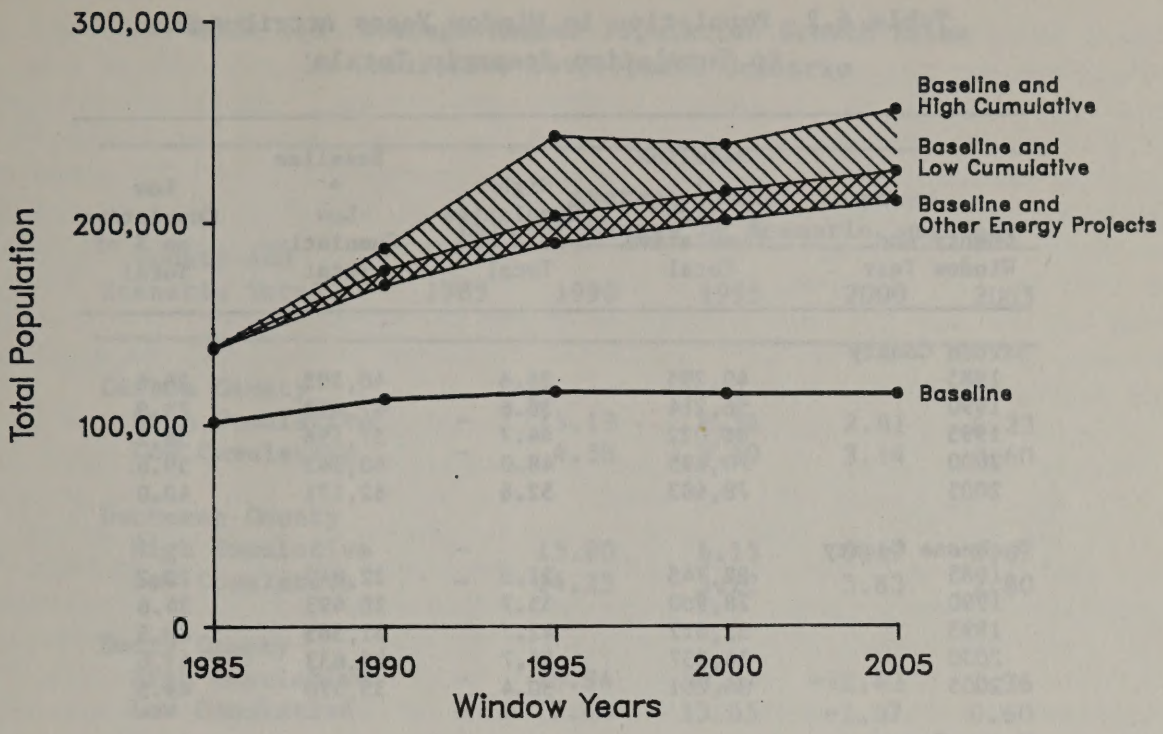

Fig. 6.1 Total Regional Population Impact by Growth Stimuli

Carbon County

The impacts on the population in Carbon County due to the proposed energy developments are projected to be larger than in any other county except Uintah County. The high cumulative scenario (composed of the high commercial development scenario and the other energy projects) would account for more than 50% of the total population projected to be in Carbon County in 2005. Yearly population impacts would range from 10,000 to 41,000 under the high cumulative scenario, and from 10,000 to 25,000 under the low cumulative scenario. These cumulative impacts would compose between 25% and 53% of the total population projected for Carbon County between 1985 and 2005 under the high commercial development scenario. Similarly, between 25% and 40% of the total population projected for Carbon County under the low commercial development scenario would be attributable to the low cumulative scenario. The difference in impact between the two cumulative scenarios is roughly 10 percentage points after the 1985 window year (see Table 6.2).

Under both cumulative development scenarios, population impacts increase steadily throughout the 20 year period. This is depicted in Table 6.3 through annual average compound growth rates. The high cumulative growth rate in 1990 is double the rate for 1995, representing a 15.19% and 6.34% annual rate of change, respectively. The annual population increase for the high cumulative scenario is between 2.8% and 6.3% during the rest of the period. For the low cumulative scenario, yearly increases range from 0.6% and 9.1%.

Table 6.2 Population in Window Years Attributable to Cumulative Scenario Totals

County and Window Year	Baseline + High Cumulative Total	High Cumulative as % of Total	Baseline + Low Cumulative Total	Low Cumulative as % of Total
Carbon County				
1985	40,295	26.6	40,295	26.6
1990	56,214	38.6	47,892	28.0
1995	66,022	44.7	57,196	36.2
2000	70,695	48.0	60,943	39.6
2005	78,683	52.6	62,171	40.0
Duchesne County				
1985	22,745	21.8	22,842	22.2
1990	28,980	35.7	28,493	34.6
1995	32,617	42.7	31,385	40.5
2000	34,337	46.7	33,633	45.6
2005	36,261	50.4	35,570	49.5
Emery County				
1985	15,785	10.9	15,785	10.9
1990	18,454	19.6	17,310	14.3
1995	28,846	47.7	19,764	23.7
2000	21,819	32.5	19,057	22.7
2005	22,134	34.3	19,008	23.5
Garfield County				
1985	4,300	0	4,300	0
1990	4,892	6.0	4,629	0.6
1995	6,012	20.2	4,914	2.3
2000	6,380	23.1	5,114	2.5
2005	6,676	22.0	5,339	2.4
Grand County				
1985	7,925	1.6	7,925	1.6
1990	10,595	22.1	10,809	23.7
1995	23,843	64.5	11,338	25.4
2000	15,886	47.6	10,807	22.9
2005	16,497	48.5	11,069	23.2
Uintah County				
1985	44,660	42.4	44,824	42.6
1990	65,565	55.3	64,588	54.6
1995	77,086	61.3	74,713	60.0
2000	83,455	65.3	82,186	64.8
2005	89,239	68.4	87,993	68.0
Wayne County				
1985	2,130	0	2,130	0
1990	2,499	6.4	2,499	6.4
1995	8,084	68.2	3,646	29.5
2000	5,520	50.4	3,498	21.7
2005	6,023	51.4	3,716	21.2

Table 6.3 Average Annual Population Growth Rates by Cumulative Development Scenario

County and Scenario Total	Average Annual Compound Percent Change by Scenario and Year				
	1985	1990	1995	2000	2005
Carbon County					
High Cumulative	-	15.19	6.34	2.81	4.23
Low Cumulative	-	4.58	9.10	3.14	0.60
Duchesne County					
High Cumulative	-	15.80	6.15	9.17	2.67
Low Cumulative	-	14.25	5.22	3.83	2.80
Emery County					
High Cumulative	-	15.94	30.67	-12.43	1.36
Low Cumulative	-	7.44	13.65	-1.57	0.60
Garfield County					
High Cumulative	-	-[a]	32.93	2.78	1.07
Low Cumulative	-	-[a]	31.49	1.70	0.79
Grand County					
High Cumulative	-	79.74	45.67	-13.25	1.14
Low Cumulative	-	82.91	2.38	-2.96	0.73
Uintah County					
High Cumulative	-	13.87	5.43	2.90	2.30
Low Cumulative	-	13.05	4.92	3.47	2.36
Wayne County					
High Cumulative	-	-[a]	103.42	-12.80	2.16
Low Cumulative	-	-[a]	46.58	-6.77	0.73

[a]Undefined.

Duchesne County

Duchesne County is expected to be the third largest county throughout the 1985-2005 period, with a total projected population (composed of the high cumulative development scenario and the baseline projections) of 36,261 in 2005. The greatest proportion of the cumulative growth would come from the development of other energy projects (more than 90%). There is not projected to be much actual difference between the high and low cumulative scenario totals, as just 691 more people would be expected under the high cumulative scenario in 2005.

Table 6.2 illustrates that the development of the proposed tar sands and other energy projects would induce between 20% and 50% of the total population projected to reside in Duchesne County. The proportion of the population attributable to both of the cumulative scenarios would increase steadily throughout the 20 year period. The population due to these energy developments would increase nearly fourfold for both high and low cumulative scenarios. This growth would translate into a 15.80% yearly growth from 1985 to 1990 for the high cumulative scenario and a 14.25% yearly growth during the same period for the low cumulative scenario. This annual growth would be between 2% and 10% for both cumulative scenarios throughout the remainder of the period (see Table 6.3).

Emery County

Total population in Emery County (composed of either the high or low cumulative scenarios and the baseline projections) is expected to peak in 1995, and experience a substantial decrease over the next five years. This decrease in additional population under either cumulative scenario is due largely to the population decline predicted to occur within each commercial development scenario: the change in population due to the high commercial development scenario is expected to drop from 10,813 in 1995 to 3,913 in 2000 — a 64% decrease; the change in population due to the low commercial development scenario is projected to decline from 1,731 to 1,151 during the same years for a 34% change. The magnitude of change in additional population is more highly influenced by the high commercial development scenario than any other stimulus because of the size of its projected population growth.

In 1995, population due to the proposed energy developments would make up nearly 48% of the total population under the high cumulative scenario and just 24% under the low cumulative scenario. This proportion is expected to drop in the year 2000 to levels of 32.5% and 22.7%, respectively, as shown in Table 6.2. The projected change in population under the high cumulative scenario would translate into a 12.43% annual decline (1995-2000). Twice during the period, however, the population due to the high cumulative scenario developments increases at an annual rate greater than 15% (see Table 6.3).

Garfield County

Garfield County is expected to experience the smallest amount of population growth due to the proposed energy developments (tar sands and other energy projects). It is projected to remain the second smallest county in terms of population; only Wayne County would be smaller. The other energy projects would have no impact on Garfield County, and the low commercial development scenario would also cause very little population growth. The low cumulative scenario would only account for 129 additional people in 2005, a mere 2.5% of the county baseline population in that year. Table 6.2 shows

that the high cumulative scenario has a somewhat larger impact, but even at its peak accounts for only 23% of the total county population (baseline projection and high cumulative scenario). There is expected to be no additional population in 1985 due to any energy development. The only period of substantial population growth would occur between 1990 to 1995, as annual increases are projected to be over 30% for both the high and low cumulative scenarios (see Table 6.3).

Grand County

Population growth attributable to the cumulative scenario projects in Grand County would be concentrated in the first 10 years, with population declining after 1995 (see Table 6.1). Table 6.3 indicates that from 1985 to 1990 annual population increases of over 75% per year would occur due to both the high and low cumulative scenarios. From 1995 to 2000, however, decreases in additional population are expected, especially under the high cumulative scenario, where population growth decreases by 50% (-13.25%/yr).

Under the high cumulative scenario, population growth induced by the energy developments in the area would make up 65% of the total population (baseline projection and high cumulative scenario) in 1995, and around 50% of the total thereafter. Under the low cumulative scenario, Table 6.2 indicates that this proportion is projected to be around 25% for most of the period.

Uintah County

Table 6.1 clearly illustrates that Uintah County would experience the greatest increase in population due to the proposed energy developments (cumulative scenarios and other energy projects). It would surpass Carbon County as the largest county, with total population projected to climb over 85,000 in the year 2005 (Table 6.2). The other energy projects proposed for the area would make up the bulk of the additional population, as the high or low commercial development scenarios alone would account for less than 3,100 additional people at any one time.

The high and low cumulative scenario population totals would be very close throughout the period, as they are projected to have induced roughly 60,000 people to relocate to Carbon County in the year 2005. Table 6.2 indicates that this additional population — caused by the cumulative scenario projects — would make up over 60% of the total county population during most of the 20 year period. Yearly population growth within each scenario is also steady: annual increases of between 2% and 14% would occur throughout the period (see Table 6.3).

Wayne County

Wayne County is expected to remain the smallest county throughout the 20 years studied. Table 6.1 shows that no population growth is expected as a result of the proposed energy developments in 1985, and little growth is expected the next window year. But in 1995, population growth as a result of the high cumulative scenario would be 35 times the 1990 figure; under the low cumulative scenario, it is approximately 7 times the 1990 figure. This scenario-specific population growth is expected to decline, however, so that by 2005, only 3,093 additional people would remain as a result of the high commercial development scenario, and only 786 as a result of the low commercial development scenario.

During most of the study period, population growth due to the high cumulative scenario developments would compose over half of the county total according to Table 6.2. For the low cumulative scenario, this proportion is between 20% and 30% during the most of the period. The large population increases expected under the high cumulative scenario in 1995 would result from a 103.42% average annual increase from 1990 to 1995. During this time there would be a 46.58% average annual increase under the low cumulative scenario (see Table 6.3).

6.2 EMPLOYMENT IMPACTS

The employment impacts by development scenario are shown in Tables 6.4-6.6. Figure 6.2 graphically illustrates the cumulative employment effects. The effects on employment from the development scenarios are very similar to the population impacts. Without the proposed "other" energy developments, Carbon County is predicted to have the greatest employment throughout the period. With the "other" energy developments, however, Uintah would have the largest level of employment. Wayne and Garfield counties would still have the smallest change in employment with or without the proposed developments under either cumulative scenario.

Carbon County

Carbon County would have the second most employment in the 20 year period, as total county employment (baseline employment and cumulative scenario totals) under the high cumulative scenario would total 34,373 in 2005 (Table 6.5). At this time, employment generated by the proposed energy developments would compose over half of the total county employment. Under the low cumulative scenario, the proportion of employment from the energy projects would only be around 40%. Both the high and low cumulative scenarios would result in increased employment progressively throughout the period, as annual increases for the high cumulative scenario range from 1.60% to 14.64%, and for the low cumulative scenario range from 1.78% to 6.47% (Table 6.6).

Table 6.4 Total Employment Impacts by County and Growth Stimuli (1985-2005)

County and Window Year	Projected Baseline (1)	Change from Baseline Employment, by Year (No. of Workers)				
		High Commercial Scenario (2)	Low Commercial Scenario (3)	Other Energy Projects (4)	High Cumulative Total (2+4)	Low Cumulative Total (3+4)
Carbon County						
1985	12,240	43	43	5,803	5,846	5,846
1990	14,050	6,182	1,597	5,394	11,576	6,991
1995	15,000	7,848	3,330	6,234	14,082	9,564
2000	15,510	8,634	3,837	6,608	15,242	10,445
2005	16,020	11,550	3,913	6,803	18,353	10,716
Duchesne County						
1985	7,220	0	16	789	789	805
1990	7,140	191	64	1,738	1,928	1,802
1995	7,100	349	76	2,528	2,877	2,604
2000	7,100	284	91	3,321	3,605	3,412
2005	7,100	283	93	4,053	4,336	4,146
Emery County						
1985	6,730	0	0	487	487	487
1990	6,650	376	202	1,104	1,480	1,306
1995	6,770	3,209	290	1,646	4,855	1,986
2000	6,800	876	219	1,700	2,576	1,919
2005	6,880	963	229	1,735	2,698	1,964
Garfield County						
1985	1,780	0	0	0	0	0
1990	1,880	144	14	0	144	14
1995	1,970	557	49	0	557	49
2000	2,080	593	51	0	593	51
2005	2,170	611	51	0	611	51
Grand County						
1985	3,530	69	70	0	69	70
1990	3,740	1,273	1,386	0	1,273	1,386
1995	3,830	8,092	1,361	0	8,092	1,361
2000	3,880	3,228	1,022	0	3,228	1,022
2005	4,030	3,334	1,043	0	3,334	1,043
Uintah County						
1985	10,620	0	123	14,010	14,010	14,133
1990	11,740	1,034	363	21,178	22,212	21,541
1995	11,900	1,823	383	22,772	24,595	23,155
2000	11,830	1,008	403	25,213	26,221	25,616
2005	11,710	1,007	406	27,267	28,680	27,673
Wayne County						
1985	960	0	0	0	0	0
1990	1,050	124	124	0	124	124
1995	1,130	4,207	790	0	4,207	790
2000	1,240	1,560	370	0	1,560	370
2005	1,360	1,489	376	0	1,489	376

Table 6.5 Employment in Window Years Attributable to Cumulative Scenario Totals

County and Window Year	Baseline + High Cumulative Total	High Cumulative as % of Total	Baseline + Low Cumulative Total	Low Cumulative as % of Total
Carbon County				
1985	18,086	32.3	18,086	32.3
1990	25,626	45.2	21,041	33.2
1995	29,082	48.4	24,564	38.9
2000	30,752	49.6	25,955	40.2
2005	34,373	53.4	26,736	40.1
Duchesne County				
1985	8,009	9.9	8,025	10.0
1990	9,086	27.0	8,942	20.2
1995	9,977	28.8	9,704	26.8
2000	10,705	33.7	10,512	32.5
2005	11,436	37.9	11,246	36.9
Emery County				
1985	7,217	6.7	7,217	6.7
1990	8,130	18.2	7,956	16.4
1995	11,625	41.8	8,756	22.7
2000	9,376	27.5	8,719	22.0
2005	9,578	28.2	8,844	22.2
Garfield County				
1985	1,780	0	1,780	0
1990	2,024	7.1	1,894	1.6
1995	2,527	22.0	2,019	2.4
2000	2,673	22.2	2,131	2.4
2005	2,781	22.0	2,221	2.3
Grand County				
1985	3,599	1.9	3,600	1.9
1990	5,013	25.4	5,126	27.0
1995	11,922	67.9	5,191	26.2
2000	7,108	45.4	4,902	20.8
2005	7,364	45.3	5,073	20.6
Uintah County				
1985	24,630	56.9	24,753	57.1
1990	33,952	65.4	33,281	64.7
1995	36,495	67.4	35,055	66.1
2000	38,051	68.9	37,446	68.4
2005	40,390	71.0	39,383	70.3
Wayne				
1985	960	0	960	0
1990	1,174	10.6	1,174	10.6
1995	5,337	78.8	1,920	41.1
2000	2,800	55.7	1,610	23.0
2005	2,849	52.3	1,736	21.7

Table 6.6 Average Annual Employment Growth Rates by Cumulative Development Scenario

County and Scenario Total	Average Annual Compound Percent Change by Scenario and Year				
	1985	1990	1995	2000	2005
Carbon County					
High Cumulative	-	14.64	4.00	1.60	3.78
Low Cumulative	-	3.64	6.47	1.78	2.59
Duchesne County					
High Cumulative	-	19.57	8.33	4.61	3.76
Low Cumulative	-	17.49	7.64	5.55	3.97
Emery County					
High Cumulative	-	24.90	26.82	-11.90	0.93
Low Cumulative	-	21.81	8.74	-0.68	0.46
Garfield					
High Cumulative	-	-[a]	31.07	1.26	0.60
Low Cumulative	-	-[a]	28.47	0.80	0
Grand					
High Cumulative	-	79.14	44.76	-16.79	0.65
Low Cumulative	-	81.69	-0.36	-5.57	0.41
Uintah					
High Cumulative	-	9.66	2.06	1.29	1.81
Low Cumulative	-	8.79	1.46	2.04	1.56
Wayne					
High Cumulative	-	-[a]	102.35	-18.00	-0.93
Low Cumulative	-	-[a]	44.82	-14.08	0.32

[a]Undefined.

Duchesne County

Employment growth in Duchesne County is projected to be steady through the 20 years studied. Most of the projected increase in employment would result from the other energy projects, so the cumulative totals for the high and low scenarios are quite close (within 2%). Employment resulting from the high cumulative development scenario would increase from 789 in 1985 to 4,336 in 2005; under the low cumulative scenario the range is 805 in 1985 to 4,146 in 2005 (Table 6.4). These changes in employment would result in yearly rates

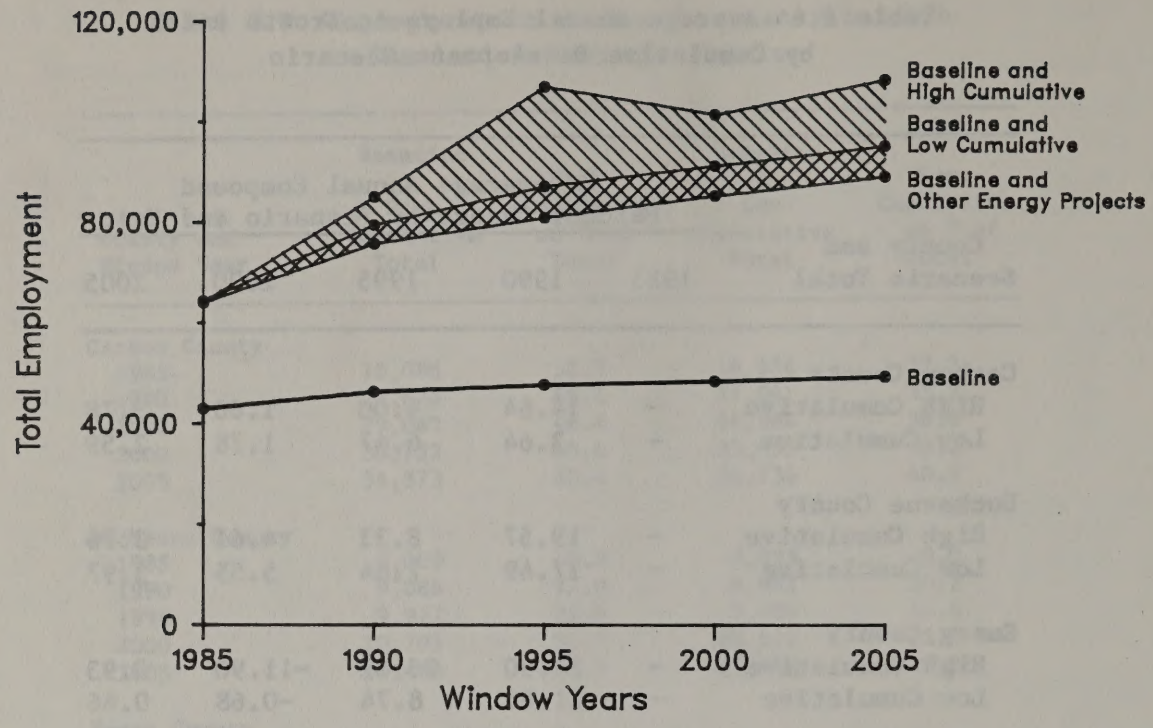

Fig. 6.2 Total Regional Employment Impact by Growth Stimuli

of increase between 3.75% and 19.57% for the high cumulative scenario: a 40% growth in employment attributable to the proposed energy projects would also contribute. This additional employment, however, would make up less than 40% of the total county employment (1985-2005).

Emery County

Employment due to the proposed energy developments would comprise a relatively small portion of the total employment in Emery County. The additional employment would account for 15% to 30% of the total employment during most of the period, except in 1995 when the high cumulative scenario contributes 42% of the total (Table 6.5). Employment growth due to these scenario-defined projects is very erratic, as exhibited by the yearly increases in Table 6.6. Under the high cumulative scenario, there are expected to be annual increases of 25% or more during the first ten years under study. During the next five years, this additional employment decreases by nearly 12% per year. Similar trends at reduced levels are exhibited by the low cumulative scenario.

Garfield County

Table 6.4 shows that there is expected to be less employment impact in Garfield than any other county in the area; in 2005 less than 700 jobs would be created by the proposed tar sands developments (there are no interrelated energy projects in Garfield County). Never during the period would the jobs created by the tar sands projects under the high cumulative (or commercial) scenario account for as much as one-fourth of the projected total county employment (Table 6.5). Employment created by the low commercial scenario would never comprise even as much as 3% of the total. Although there are few jobs involved, employment generated under the high commercial scenario is expected to increase almost fourfold from 1990 to 1995. The same sort of increase would occur during this period under the low commercial scenario, although it would be an actual gain of only 35 jobs (Table 6.6).

Grand County

In Grand County employment is projected to peak in 1995, when total employment (projected baseline and cumulative scenario total) under the high commercial scenario would reach 11,922. Of this, 8,092 (almost 68%) would result from the proposed high scenario tar sands developments in the area (Table 6.4). This additional employment is expected to decrease during the next 10 years, so that in 2005, 45% of the total county employment would result from the proposed high cumulative scenario projects (Table 6.5). Under the low cumulative scenario, 21% of the total employment would be from the tar sands projects in 2005.

Large yearly employment increases would occur in the first five years, as annual increases of around 80% are exhibited under both scenarios (Table 6.6). Both the high and low cumulative scenarios would also undergo a sharp decrease in employment from 1995 to 2000, and then increase slightly through the end of the period.

Uintah County

Employment in Uintah County is projected to be greater than any other county in the area. Substantial growth is forecast throughout the period under both the high and low cumulative scenarios. Employment generated under these scenarios would make up between one-half and three-fourths of the total county employment (Table 6.5). As in Duchesne County, the high and low cumulative totals are quite close as a result of the substantial impact corresponding to the other energy projects. Annual increases would be steady for both scenarios, ranging from 1% to 10% under the high cumulative and from 1% to 9% under the low cumulative scenarios (Table 6.6). Total employment projected for the year 2005 would be nearly four times greater than in any other county except Carbon.

Wayne County

Small actual changes in employment are projected to occur in Wayne County, but they correspond to large proportional increases. In 1995, employment generated under the high cumulative (or commercial) scenario would compose nearly 80% of the county total (Table 6.5). During the next 10 years, however, this proportion is anticipated to decrease to a still substantial 53%. Under the low cumulative scenario, these percentages would be about half of the high cumulative proportions. From 1990 to 1995, the increase in employment under the high cumulative scenario would result from an average annual increase of 102%. In each of the subsequent two five year periods, however, an annual decrease is projected (Table 6.6).

7 SOCIOECONOMIC IMPACTS BY COMMUNITY AND SPECIAL TAR SANDS AREA

In this section, a direct correlation is drawn between the population impacts on the communities and the particular STSA (or STSAs) causing these impacts. Table 7.1 presents the population impacts under the high commercial development scenario in two window years, 1990 and 2005. Table 7.2 shows the population impacts under the low commercial development scenario for the same window years. In the following sections, the impacts are described by scenario.

7.1 HIGH COMMERCIAL DEVELOPMENT SCENARIO

The Sunnyside STSA would have the most population impact overall, and would affect the most communities. The largest impacts from the Sunnyside STSA would occur in the Price and the East Carbon CCDs, where population would increase substantially in the period 1990-2005. The Price CCD is projected to have 16,544 additional people in 2005 as a result of development of the Sunnyside STSA; East Carbon CCD would have an additional 7,391 people. Considerable impacts from this STSA would also be felt in the Castle Dale-Huntington and Green River CCDs in Emery County.

Three STSAs -- Asphalt Ridge/White Rocks, Hill Creek, and Raven Ridge/Rimrock -- would have an impact on the Roosevelt, Uintah Ouray, and Vernal CCDs. Of these, the development of the Asphalt Ridge STSA would have the greatest effect; population in each CCD is forecast to increase by over 500 people. The Raven Ridge STSA would have the next greatest population impact, followed by the Hill Creek STSA.

The Argyle Canyon/Willow Creek and San Rafael Swell STSAs would also affect at least three CCDs. The Argyle Canyon STSA would have an impact on the Duchesne CCD in Duchesne County and the Helper and Price CCDs in Carbon County. The San Rafael Swell STSA would affect the three CCDs in Emery County (Castle Dale-Huntington, Emery-Ferron, and Green River CCDs), and the Hanksville CCD in Wayne County.

The Tar Sands Triangle STSA would impact only the Green River and Hanksville CCDs. These impacts would be large, however, as population would increase by 956 in the Green River CCD and 2,938 in the Hanksville CCD in the year 2005.

Two STSAs -- Circle Cliffs and P.R. Spring -- would affect only one CCD each. The Circle Cliffs STSA would add 1,466 people to the population in the Escalante CCD in 2005. The P.R. Spring STSA would increase the population in the Thompson CCD in Grand County by 7,643 in 2005.

Four CCDs would feel population impacts from at least three STSAs. The Roosevelt, Uintah Ouray, and Vernal CCDs would all be affected by the Asphalt

Table 7.1 Change in Population by Community Correlated with the High Commercial Scenario Development of the STSAs, 1990 and 2005

Counties and Communities	Change from Baseline Population, by STSA and Year																	
	Argyle Canyon/ Willow Creek		Asphalt Ridge/ White Rocks		Circle Cliffs		Hill Creek		P.R. Spring		Raven Ridge/ Rimrock		San Rafael Swell		Sunnyside		Tar Sands Triangle	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
Carbon County																		
East Carbon CCD															3,138	7,391		
East Carbon															2,322	5,469		
Sunnyside															816	1,922		
Unincorporated															0	0		
Helper CCD	37	77													900	1,471		
Helper	22	46													540	883		
Scofield	--	--													0	0		
Unincorporated	15	31													360	588		
Price CCD	143	167													6,999	16,544		
Hiawatha	--	--													0	0		
Price	93	109													4,549	10,753		
Wellington	26	30													1,260	2,978		
Unincorporated	24	28													1,190	2,813		
Duchesne County																		
Duchesne CCD	129	248																
Duchesne City	129	248																
Rest of CCD	0	0																
Roosevelt CCD			555	630			0	193			114	53						
Altamont			0	0			0	0			0	0						
Myton			17	18			0	6			3	2						
Roosevelt			333	378			0	116			68	32						
Rest of CCD			206	234			0	71			42	19						
Emery County																		
Castle Dale-Huntington CCD													130	297	1,048	1,990		
Castle Dale													45	104	367	696		
Cleveland													8	18	62	119		
Elmo													5	12	42	80		
Huntington													32	74	263	498		
Orangeville													32	74	263	498		
Unincorporated													6	15	53	99		

Table 7.1 (Cont'd)

Counties and Communities	Change from Baseline Population, by STSA and Year																	
	Argyle Canyon/ Willow Creek		Asphalt Ridge/ White Rocks		Circle Cliffs		Hill Creek		P.R. Spring		Raven Ridge/ Rimrock		San Rafael Swell		Sunnyside		Tar Sands Triangle	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
Emery County (Cont'd)																		
Emery-Ferron CCD													77	260				
Clawson													0	0				
Emery													19	65				
Ferron													58	195				
Unincorporated													0	0				
Green River CCD													44	195	445	620	146	956
Green River													38	168	382	533	126	822
Unincorporated													6	27	63	87	20	134
Garfield County																		
Escalante CCD					292	1,466												
Boulder					29	147												
Escalante					263	1,319												
Hite CCD																		
Rest of County																		
Grand County																		
Thompson CCD									2,259	7,643								
Rest of County									--	--								
Uintah County																		
Uintah Ouray CCD			487	594			0	66			10	0						
Ballard			195	237			0	27			4	0						
Rest of CCD			292	357			0	39			6	0						
Vernal CCD			502	494			0	316			566	563						
Naples			75	73			0	0			85	85						
Vernal			251	247			0	0			283	282						
Rest of CCD			176	174			0	158			198	197						
Wayne County																		
Hanksville CCD													17	155			142	2,938
Rest of County													--	--			--	--

Table 7.2 Change in Population by Community Correlated with the Low Commercial Development of the STSAs, 1990 and 2005

Counties and Communities	Change from Baseline Population, by STSA and Year																	
	Argyle Canyon/ Willow Creek		Asphalt Ridge/ White Rocks		Circle Cliffs		Hill Creek		P.R. Spring		Raven Ridge/ Rimrock		San Rafael Swell		Sunnyside		Tar Sands Triangle	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
Carbon County																		
East Carbon CCD															821	2,715		
East Carbon															608	2,009		
Sunnyside															213	706		
Unincorporated															0	0		
Helper CCD															219	482		
Helper															131	289		
Scofield															0	0		
Unincorporated															88	193		
Price CCD															1,855	5,940		
Hiawatha															0	0		
Price															1,206	3,861		
Wellington															334	1,069		
Unincorporated															315	1,010		
Duchesne County																		
Duchesne CCD																		
Duchesne City																		
Rest of CCD																		
Roosevelt CCD			306	425														
Altamont			0	0														
Myton			9	13														
Roosevelt			184	255														
Rest of CCD			113	157														
Emery County																		
Castle Dale-Huntington CCD													127	28	258	677		
Castle Dale													45	10	90	237		
Cleveland													8	2	15	40		
Elmo													5	1	10	27		
Huntington													32	7	64	169		
Orangeville													32	7	64	169		
Unincorporated													6	1	13	34		

Table 7.2 (Cont'd)

Counties and Communities	Change from Baseline Population, by STSA and Year																	
	Argyle Canyon/ Willow Creek		Asphalt Ridge/ White Rocks		Circle Cliffs		Hill Creek		P.R. Spring		Raven Ridge/ Rimrock		San Rafael Swell		Sunnyside		Tar Sands Triangle	
	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005	1990	2005
Emery County (Cont'd)																		
Emery-Ferron CCD													67	33				
Clawson													0	0				
Emery													17	8				
Ferron													50	25				
Unincorporated													18	7				
Green River CCD													59	18	38	172	198	264
Green River													51	16	33	148	170	226
Unincorporated													9	3	5	24	27	37
Garfield County																		
Escalante CCD					29	129												
Boulder					3	13												
Escalante					26	116												
Hite CCD																		
Rest of County																		
Grand County																		
Thompson CCD									2,510	2,453								
Rest of County									--	--								
Uintah County																		
Uintah Ouray CCD			322	400														
Ballard			129	160														
Rest of CCD			193	240														
Vernal CCD			267	387														
Naples			0	0														
Vernal			134	194														
Rest of CCD			0	0														
Wayne County																		
Hanksville CCD													17	16			147	770
Rest of County													--	--			--	--

Ridge, Hill Creek, and Raven Ridge STSAs. The Green River CCD would have population impacts from the San Rafael Swell, Sunnyside, and Tar Sands Triangle STSAs. All other CCDs would be impacted by two or fewer STSAs.

7.2 LOW COMMERCIAL DEVELOPMENT SCENARIO

Under the low commercial development scenario, the Sunnyside STSA would again cause the largest population impacts. This STSA would affect the same five CCDs as under the high scenario: East Carbon, Helper, Price, Castle Dale-Huntington, and Green River CCDs. The population impacts would be less, but the Price CCD (5,940 additional people in 2005) and the East Carbon CCD (2,715 additional people in 2005) would incur the greatest level of effects.

The San Rafael Swell STSA would again affect four CCDs -- all three CCDs in Emery County and the Hanksville CCD in Wayne County. Only minor increases in population would result, however, as Castle Dale-Huntington would grow the most -- 127 additional people in 1995, and 28 additional in 2005.

The Asphalt Ridge/White Rocks STSA would affect three CCDs under the low commercial development scenario. Population impacts from this STSA would be felt in Roosevelt CCD in Duchesne County, and Uintah Ouray and Vernal CCDs in Uintah County. Each of these CCDs would have around 400 additional people in 2005 as a result of development in the Asphalt Ridge STSA.

The Tar Sands Triangle STSA would affect the same two CCDs as under the high commercial development scenario. Hanksville CCD would have 770 additional people in 2005, and the Green River CCD would have 264 in 2005.

The Circle Cliffs and P.R. Spring STSAs would affect only one CCD each. The Circle Cliffs STSA would cause population in the Escalante CCD in Garfield County to increase by 129 in 2005. The P.R. Spring STSA would result in 2,453 additional people in the Thompson CCD in 2005.

Three STSAs -- Argyle Canyon/Willow Creek, Hill Creek, and Raven Ridge/Rimrock -- would have no determinable impact under the low commercial development scenario.

Only the Green River CCD would be affected by three STSAs under this scenario. Population impacts would be felt in the Green River CCD from the San Rafael Swell, Sunnyside, and Tar Sands Triangle STSAs. Price CCD, although affected by only the Sunnyside STSA, would grow the most, with 5,940 additional people projected in 2005.

APPENDIX A

ANALYTICAL METHODS, ASSUMPTIONS AND MODELS USED IN THE ANALYSIS

APPENDIX A

ANALYTICAL METHODS, ASSUMPTIONS AND MODELS USED IN THE ANALYSIS

This appendix identifies the assumptions and analytical methods used in this report, and includes a discussion of the Utah Process Economic and Demographic Impact Simulation Model (UPED), and the Spatial Allocation Model (SAM). The summary descriptions of UPED and SAM are extracted from *Final Socioeconomic Technical Report, Uintah Basin Synfuels Development*, published by the Utah State Energy Office et al. (Feb. 1983).

A.1 STUDY CONDITIONS, ASSUMPTIONS AND METHODS

A.1.1 Baseline Projections

Population and Employment

The baseline projections contained in this report reflect the future based on the existing economic structure of the areas and the changing demographic characteristics of the population. The baseline is not a prediction of the future but rather an attempt to depict the direction current trends are likely to take in the area without tar sands development. Alternative projections which assume tar sands development are then compared to the baseline projection to determine the impact that tar sands development will have on the area.

Characteristic of the baseline projections are declining rates of growth over time. It is assumed that with a given economic structure, an area will begin to stabilize over the years as its economy matures; under these conditions accelerated growth would require increases in the basic employment sectors that would change the area's economic structure. The Utah Process Economic and Demographic Impact Projection Model (UPED) and the Spatial Allocation Model (SAM) were applied in making the baseline projections.

Obviously the economic recession of 1981-82 will have an impact on baseline projections for Utah. These projections were produced before the severity of the 1981-82 national recession and its full impact on the state of Utah became apparent. These projections assume that (1) the national recession would have ended in 1982, (2) the recovery would occur during 1983, and (3) 1983 would be a growth year. The projections also assume that the recession will have no permanent deleterious structural effect on the state's energy and minerals industries or its economy in general. The validity of this assumption cannot be determined until a national recovery is well under way.

The baseline projections have been allocated to the census county divisions (CCDs) with the Spatial Allocation Model (SAM).* In allocating the areawide baseline projections among the constituent CCDs, a number of crucial assumptions were made. The most important of these is that the proportional distribution among these CCDs of each sector's basic employment would retain the pattern currently observed. Also assumed was the continuation of current inter-CCD trade patterns. The Price and Vernal CCDs are assumed to continue serving as the highest order market centers for most industrial sectors, with the other CCDs purchasing substantial amounts of goods and services from these areas. The Roosevelt CCD also serves as a high order center, especially as a source of commodities for the Duchesne and Uintah-Ouray CCDs, but Roosevelt does continue to procure substantial quantities of goods and services from Vernal.

The community level baseline projections were developed with the cooperation of local government representatives. The Southeast Utah Association of Governments, the Uintah Basin Association of Governments and the Carbon and Uintah County Planning offices were participants. The basic assumption is that the proportion of the population which was historically located in incorporated communities would continue. Exceptions were made where there are constraints to growth based on current capacities and existing plans for expansion of services and facilities.

The baseline projections have incorporated assumptions regarding coal production, oil and gas development, uranium development, manufacturing, power plant construction and commuting patterns which are important in understanding the baseline projections. The following discussion describes these assumptions; the counties with projections based on similar assumptions are discussed together.

Duchesne and Uintah Counties. In Duchesne and Uintah Counties basic employment in the oil and gas industry is projected to increase during the 1980s (5.5% annual rate) but at slower rates of growth than were evidenced during the seventies. Oil and gas employment did increase significantly during the early part of the eighties but currently oil and gas activity has slowed. How long this industry would stay depressed cannot yet be foreseen. In the baseline projection, the oil and gas industry is projected to reach maturity in 1990 and remain constant thereafter.

In Uintah County the construction of the Bonanza Power Plant would create a small peaking of employment in 1984 and would contribute to the increase in basic employment as it moves into the operations phase. Construction of the portions of the Central Utah Project (CUP) -- water development projects -- are also assumed in the baseline. CUP would provide

*See Sec. A.2 for a description of SAM.

800 jobs through 1985 declining to less than 200 by 1990. Very little change is anticipated in other basic sectors in the baseline projections.

Carbon and Emery Counties. In Carbon and Emery counties the baseline projections assumed growth in coal production to increase from 12.6 million tons in 1980 and move toward the target of 21.6 million tons per year by 1990. During 1982 coal production exceeded 17 million tons per year. However, recent layoffs in this industry would reduce production in 1983 and it would appear that the short term projections (1983) have been overstated. It is still too early to tell whether or not the longer term projections for the coal industry have been overstated. The demand for coal would be created primarily by the development of the first two units of the Intermountain Power Project and units 3 and 4 of the Hunter Power Plant complex. After 1990, coal production is assumed to remain stable.* Production is allocated among the census county divisions (CCDs) in accordance with expectations of industry and local planners. Coal mining in the Green River CCD is assumed to be phased out by 1983 in the baseline projection.

The Utah Power and Light's power plant construction plans include units 3 and 4 of the Hunter Power Plant. Unit 3 is assumed to be completed on schedule in 1983. The Hunter Unit 4 is assumed to be delayed three years from its original schedule; construction would begin in 1985 with completion scheduled in 1987. Other sectors which drive growth in the local economy are assumed to follow historical paths throughout the projection period.

Grand County. Uranium mining has formed the economic base of this county for several decades and has been the source of historical boom periods for this county. This industry also has experienced periods of decline like the one it is currently in; the price of processed uranium ore fell from $42 per pound in 1978 to about $27 per pound in 1981. Uranium production and employment are assumed to remain at their 1982 depressed levels throughout the year 2000. This assumption was developed from information provided by local planners, industry representatives and from national uranium production forecasts. Oil and gas development was assumed to grow at a 2.4% annual rate throughout the decade and remain stable thereafter. Other driving sectors (e.g., tourism) are assumed to follow historical paths throughout the projection period.

Garfield County. Much interest and discussion has centered around coal development in the Alton fields and the use of this coal to fire the proposed

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*Information from *Utah Energy Facility Siting Study -- Chapter 8 -- Utah Coal Resources*, Utah Consortium for Energy Research and Education, 1981, was used extensively in developing coal demand forecasts.

Allen Power Plant near Las Vegas, Nevada. This project is currently on hold and must overcome several obstacles before it becomes reality. Because of the uncertainty associated with this project and because coal development has historically not been a significant part of the economic structure of the area, Alton coal development or any associated power plant development was not included in the baseline projections. Uranium mining at Ticaboo in Eastern Garfield County is assumed to remain constant at late 1982 depressed levels until 1985 when it is assumed to increase to its early 1982 levels and remain constant thereafter. Tourism and trade are assumed to continue to be the driving force behind any growth in Garfield County under a baseline conditions. Growth in these industries is assumed to follow historical growth patterns. Agriculture is assumed to decline over the projection period consistent with historical trends. Commuting patterns are assumed to remain fairly constant as identified from employers and other primary data sources.

Wayne County. The economic base of Wayne County comprises agriculture and government employment. Agriculture is assumed to remain constant through the projection period. Basic government employment is assumed to grow slightly through the projection period consistent with historical growth rates.

Personal Income and Wages

The analysis of income and wages was carried out at the county levels, and the data are provided in 1980 dollars (1980 $).

The average monthly rates for the six counties from 1975 to 1980 for each major nonagricultural employment sector are provided in the report. Mining; construction; and transportation, communication, and utilities have historically had the highest average wage levels. Under the proposed developments, increased employment would be concentrated in the mining and construction sectors.

The relationship between the state's per capita income and the per capita income of the counties was utilized in projecting baseline county personal income figures.* The relationship of county per capita income to the average state per capita income is provided in the report. The baseline income projections for the state assumed an annual growth rate of 1.7%; by the year 2000 the state per capita income would be $11,568.

Carbon County achieved high average per capita income levels relative to the state in the last half of the 1970s. It is assumed that this phenomenon would be reversed during the next two decades and that by the year

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*The approach for projection of county personal income was developed by the Bureau of Economic and Business Research, University of Utah, Salt Lake City, Utah.

2000, Carbon County per capita personal income would equal that of the state. Per capita personal income in Emery, Grand and Uintah counties are presumed to stabilize at 100% of the state figures for the entire projection period. Per capita income in Duchesne County has risen relative to the state average through the 1970s. This trend is assumed to continue with per capita income for Duchesne County reaching 95% of the state figure. Personal income in Garfield and Wayne counties has been consistently below the state average; it has been assumed that these counties would maintain per capita income levels that would be 85%, and 80% of the state average, respectively, over the projection period.

A.1.2 Impact Projections

Areawide Impacts

The modeling of economic and demographic impacts through the use of the Utah Process Economic and Demographic Model (UPED) was accomplished by splitting the area of analysis into two regions. The Uintah Basin region which includes Duchesne, Uintah, and Daggett counties in Utah and the county census divisions of Rangely and Dinosaur in Rio Blanco and Moffatt in Northeast Colorado make up the first region. The second region, the Southeast Utah region, includes Carbon, Emery, Grand, and San Juan counties, the Hanksville CCD in Wayne County, and the Escalante CCD in Garfield County. These two regions interact economically to only a limited extent and are considered separate economic regions. For this report they were treated separately for modeling purposes.

CCD Level Impacts

Under the high commercial development scenario, the tar sands development proposals are in areas where little or no existing population centers or communities exist. For example, the P.R. Spring STSA, near the border of Uintah and Grand Counties, would be primarily accessed via I-70 near the small town of Cisco, a small unincorporated town in the Thompson CCD. The Tar Sands Triangle STSA would be accessed from State Route 10 near Hanksville, another very small unincorporated community. Population centers are at some distance from either of these STSAs and for this reason it was assumed that any development of the magnitude being proposed would require the development of a new community. These new communities would be developed at the existing communities of Cisco and Hanksville or would be developed nearer the projects.

The Spatial Allocation Model (SAM) was used to allocate the multicounty division (MCD) impact projections produced by the UPED Model among affected community groups (census county divisions or CCDs). SAM allocations are based on commuting patterns of the tar sands operations and construction work

forces, historical industrial sector-specific trading patterns, and assumed changes in these trading patterns. Such trading pattern changes would be expected to result from growth in currently lower order-low self sufficiency CCDs (e.g., East Carbon CCD) which would be heavily impacted by the tar sands developments.

The trading pattern assumptions are incorporated into a set of SAM calibration parameters, called SPINTs. Estimation of the SPINT parameters constitutes the primary analytical task in the SAM calibration. In both the Uintah Basin and Southeast Area, the trading pattern assumptions used in the tar sands impact analysis were based largely on those developed for the current baseline calibration.

As part of the baseline calibration, continuation of current inter-CCD trading patterns was assumed. Vernal CCD is assumed to continue serving as the highest order market center for most industrial sectors, with the other CCDs purchasing substantial amounts of goods and service from Vernal. The Roosevelt CCD also serves as a high order center, especially as a source of commodities for the Duchesne and Uintah-Ouray CCDs, but Roosevelt does continue to procure substantial quantities of goods and services from Vernal. The only exceptions are in the nonmetal-nonfuel mining (gravel pits) and construction sectors where minor adjustments were made such that each CCD experiencing major growth impacts is projected to become more self-sufficient in providing its residents with these sectoral services.

The bulk of the Southeast Utah trading pattern assumptions are derived from the baseline calibration. Thus, the Price CCD remains throughout the projection period as the highest order center in the MCD, with the Moab CCD being the major second level service center dealing primarily with the San Juan and Grand County CCDs.

Several additions and modifications were required, however, in order to deal appropriately with the issues addressed in the present study. First, the assumption was made that if any of the STSAs are developed in the Thompson, Escalante or Hanksville CCDs, the local economies — either in the form of existing communities or new towns -- would become more self-sufficient. This would occur roughly to the same degree as that of the Price CCD in the baseline. This assumption seems reasonable in light of (1) the remoteness of these areas from existing major shopping areas, combined with (2) the large number of high income basic jobs which would be directly associated with the tar sands development. The minor amount of services to be provided to the Thompson, Hanksville, and Escalante CCDs from outside of their local economies are assumed to be equally distributed among the Price CCD and an area defined as the "rest of the world" in the model (i.e., Richfield, Cedar City, Grand Junction, etc.). In the case of the state school's sector, it was assumed that such services will be provided in equal proportions by institutions located in the Price CCD and the "rest of the world" area. None of these three CCDs are assumed to become a trading destination for residents of any other CCD.

Two CCDs, the East Carbon, Green River and Thompson CCDs are projected to undergo substantial trade pattern changes in response to the proposed tar sands developments. The East Carbon and Green River CCDs are assumed to become much more self-sufficient than they are in the baseline projection. This reflects the major influx of high basic employment. These CCDs are, however, assumed to achieve a lesser degree of self-sufficiency than the Thompson, Hanksville, and Escalante CCDs because of the continued close proximity of the larger Price and Moab CCD trading centers -- which are assumed to continue to serve part of the requirements of East Carbon and Green River.

As was discussed earlier, a major community is assumed to be developed in the Thompson and Hanksville CCDs, if the P.R. Spring and Tar Sands Triangle STSAs are developed. To account for these new towns (or major expansions of existing unincorporated communities) these CCDs are assumed to become much more self-sufficient in all industrial sectors, while most of the out-of-CCD shopping would occur in the "rest of the world" area, including Grand Junction, Colorado.

In all sectors, "rest-of-the-world" residents are assumed to purchase all of their goods and services from outside the Southeast area. Finally, as in the Uintah Basin, all CCDs are assumed to become much more self-sufficient in the nonmetal-nonfuel mining and construction sectors.

Commuting Assumptions

A two-step procedure was used to develop commuting pattern assumptions for the workers directly involved in the construction and operations phases of the tar sands projects. First, a simple gravity model was applied based on existing community size and estimated road distance from each STSA. Exponents of 1.019 and 2.0 were applied to the distance estimates for the construction and operations work forces, respectively. Second, the results of the gravity model were reviewed by local planners and modified where appropriate to reflect the local conditions and opinions. The commuting patterns adopted for each of the STSAs are presented in Tables A.1 and A.2.

Community Level Projections

Allocation of the SAM CCD-level projections were accomplished by using assumptions developed by local planners. Primarily the Southeast Utah Association of Governments, the Uintah Basin Association of Governments and the Carbon and Uintah County Planning offices. Assumptions were made based on (1) existing capacities for residential and commercial development and constraints to growth, and (2) existing plans for expansion of services and facilities.

Table A.1 Commuting Patterns for Tar Sands Development
Direct Employees — Uintah Basin Area

STSA	Proportion of Employees Living in CCD					
	Duchesne	Roosevelt	North Uintah Ouray	South Uintah Ouray	Vernal	Rangely, Colorado
Argyle Canyon/Willow Creek (Uintah Basin portion)						
Construction	1.0	-	-	-	-	-
Operation	-	-	-	-	-	-
White Rocks/Asphalt Ridge						
Construction	-	0.36	0.13	0.11	0.40	-
Operation	-	0.30	0.37	0.10	0.23	-
Hill Creek						
Construction	-	0.32	-	0.16	0.52	-
Operation	-	0.31	-	0.17	0.52	-
Raven Ridge						
Construction	-	0.16	-	0.02	0.72	0.10
Operation	-	0.08	-	0.01	0.81	0.10

Work Force Assumptions

The manpower profiles used to drive the economic and demographic impact analysis were provided by the BLM. As mentioned earlier, construction work force estimates were used separately in UPED from those of the operations work force; this is based on the assumption that construction workers living in communities exert less demand on public and private goods and services than do permanent operations workers. There are two reasons for this effect: first, because of their temporary nature; and second, because they have a higher propensity to be either single, unaccompanied by families or to have smaller families. The construction workers for the tar sands projects are assumed to behave similarly to major project construction workers, in terms of both household size (dependency ratio) and geographic dispersion of residences. Information on construction worker characteristics was taken from *Construction Worker Profile*, developed by Mountain West Research.

Personal Income Impacts

The impact on personal income resulting from the development of the tar sands leases is based on changes in the population of the impact area; changes in the number and industrial mix of jobs in the area; changes in per capita

Table A.2 Commuting Patterns of Tar Sands Development
Direct Employees -- Southern Tar Sands Area

STSA	Proportion of Employees Living in CCD									
	Helper	Price	East Carbon	Castle Dale-Huntington	Emery-Ferron	Green River	Thompson	Hanksville	Escalante	Mesa Co., Colorado
Argyle Canyon/Willow Creek (STSA Portion)										
Construction	0.31	0.60	-	-	-	-	-	-	-	-
Operation	0.39	0.61	-	-	-	-	-	-	-	-
Sunnyside										
Construction	0.10	0.49	0.26	0.10	-	0.05	-	-	-	-
Operation	0.07	0.50	0.33	0.08	-	0.02	-	-	-	-
P.R. Spring										
Construction	-	-	-	-	-	-	0.87	-	-	0.13
Operation	-	-	-	-	-	-	1.0	-	-	-
San Rafael Swell										
Construction	-	-	-	0.53	0.28	0.16	-	0.03	-	-
Operation	-	-	-	0.33	0.29	0.21	-	0.17	-	-
Tar Sands Triangle										
Construction	-	-	-	-	-	0.50	-	0.50	-	-
Operation	-	-	-	-	-	0.25	-	0.75	-	-
Circle Cliffs										
Construction	-	-	-	-	-	-	-	-	1.0	-
Operation	-	-	-	-	-	-	-	-	1.0	-

property incomes, transfer payments, and personal contributions to social insurance; and changes in wage rates in each industrial sector. The relevant population and industry-specific employment figures are the employment and population impact projections which are presented for each alternative.

Average monthly wages for each industrial sector are projected by selecting a representative 1980 wage payment for that sector in the impact area. This figure is projected to increase at the average annual rate of growth of per capita personal income assumed for the State of Utah (1.724% per year) in the baseline personal income projection described previously. Projected average monthly wages and personal income are presented in 1980 dollars through the study.

The average monthly wage for each of the industrial sectors is based on the Carbon County experience. The assumption was based on the similarities of the development of mined mineral resources as a major economic sector in relatively isolated rural areas. Incomes accruing to individual persons, rather than persons as economic producers, are typically categorized as property incomes (interest, rents, dividends) plus transfer payments (unemployment compensation, welfare) minus individual contributions to social insurance. These components were aggregated into a single category. Per capita income in this category within the State of Utah is assumed to be the same percentage of its national counterpart as is per capita personal income as a whole (83%). The resultant per capita figure is then increased at the same average annual rate as are the various wage rates to produce annual projections of per capita property income plus transfer payments minus personal social insurance contribution figures.

Under both of the tar sands development scenarios the relatively higher per capita income would be anticipated with the projected increases in mining (associated with proposed leasing) because of the higher wages paid in the mining and construction sectors.

A.2 MODELS

A.2.1 Utah Process Economic and Demographic Model

The Utah Process Economic and Demographic Impact Simulation (UPED) Model is the official model used by the Utah State Planning Coordinator's Office to project population and employment growth in the state.* The UPED

*Weaver, Rodger, et al., *UPED 79 - Report on the Revisions of the Utah Process Economic and Demographic Impact Model (UPED)*, Bureau of Economic and Business Research, College of Business, University of Utah and Utah State Planning Coordinator's Office, Salt Lake City, Utah, 1980.

model is a hybrid of two standard population and economic projection methodologies: (1) the cohort survival model and (2) the economic base model.

In the three-component, cohort survival population model, future population levels are projected from base year figures by adding births, subtracting deaths, and adding net in-migration or subtracting net out-migration. The values of each of the three components of population change (births, deaths, and migration) are projected as a function of the initial year values and the resultant increments are added or subtracted to generate the first projection year's values. The process is then repeated to generate the second projection year's values and so on to the last projection year. The population is disaggregated into appropriate subgroups, called cohorts, whose values are projected over time. In UPED, sex and single year of age cohorts are used. Through the projection years, of course, each cohort ages and its behavior with respect to demand for goods and services, labor force participation, fertility, mortality, and geographic mobility varies with the aging process.

According to the economic base concept, for all but the largest areas (i.e., national-continental regions), the primary determinant of the level of economic activity, and consequently of population size, is the amount of goods and services produced for export to other areas. Increases or decreases in basic (export) employment produce corresponding changes in the number of households deriving their income from these sectors. These changes, in turn, produce changes in the demand for goods and services produced locally for the local consumption. (These local production/local consumption activities are referred to variously as nonbasic, service, residentiary, or population dependent sectors.) Initial changes in population dependent sectors, in turn, produce changes in population and in household incomes, which generate further changes until, finally, a given projected initial change in basic sector employment will produce a multiplicative or "multiplier" change in population dependent job opportunities and local employment as well as in population.

In UPED, the economic base methodology is adapted to affect the population projections through the migration component. Population projections, in turn, generate residentiary employment for each level of basic employment. Thus, the cohort survival and economic base methodologies are combined in UPED to form a complex systems model. The workings of the UPED model and of its key data requirements are presented in Fig. A.1. The top three boxes represent the natural increase (births and deaths), again, and the nonemployment related part of the migration components of UPED's population project methodology.

The initial (year t) population, consisting of a census-type count or estimate of all people residing in the area by age and sex, is adjusted to reflect the temporary absence of some individuals who are permanent residents (an increase) and/or the temporary presence of individuals who are not permanent residents (a decrease). Relevant categories include college students, military, and other such temporary residents. The resultant

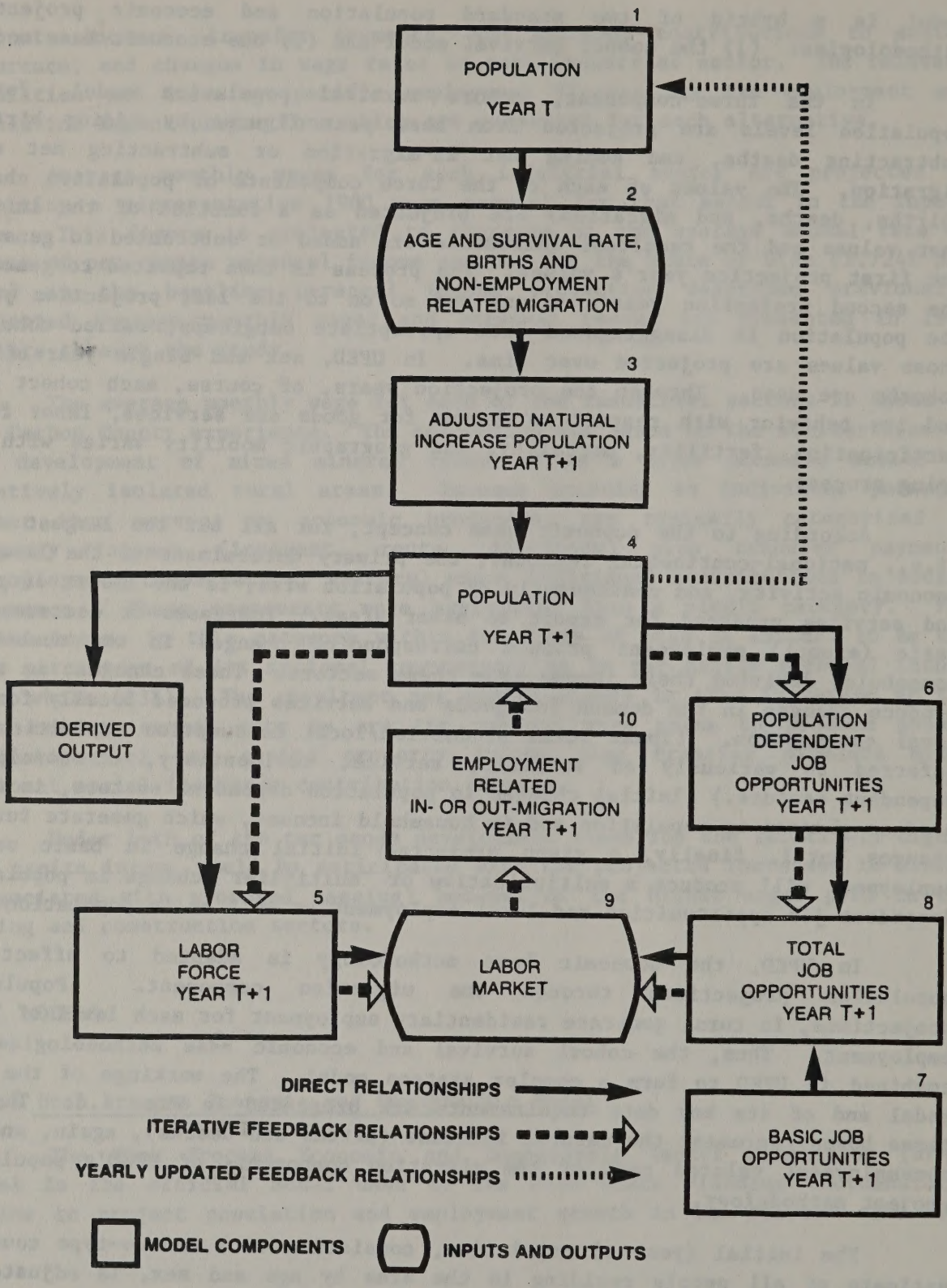

Fig. A.1 Utah Process and Demographic Impact Simulation Model General Flow Chart (Source: *Final Socioeconomic Technical Report, Uintah Basin Synfuels Development*, Utah State Energy Office, et al. (Feb. 1983).

estimate of the permanent resident population is then survived by applying cohort specific survival rates. The result is the subset of the initial resident population expected to still be alive the next year. Members of each cohort have aged one year. The aged-survived population is adjusted to reflect projected levels of temporary absence or presence and permanent nonemployment related in- and out-migration. Total births are projected by applying a vector of age-specific birth rates to the female component of this adjusted aged-survived population. Infants' sex composition and infant mortality are also projected at this stage. The result of these calculations, as shown in Box 3, is the Adjusted Natural Increase Population at Year T+1, which becomes the initial estimate of population in that year (Box 4).

The first approximation population projection is the source of two elements of labor market analysis: (1) the initial (pre-employment related migration) labor force and (2) initial population dependent job opportunities at year T+1 (Boxes 5 and 6, respectively). The labor force is derived by applying projected age and sex specific labor force participation rates to the projected population. The projected participation rates are dependent upon both extrapolations of their secular trends and year-to-year changes in the area economic opportunity.

Population dependent job opportunities are projected as dependent upon (1) the size and age composition of the population, (2) projected sector specific ratios of area per capita residentiary employment to national employment per capita, and (3) projections of national residentiary employment by sector and/or national population by cohort. Thus, changes in the size and/or demographic composition of the population, in the capability of the area to produce goods and services for its own consumption, and/or national economic and demographic conditions can all influence the projection of each sector's population dependent job opportunities. The most critical operational assumptions here are the local-national per capita residentiary employment ratios. Of special importance is the ability to adjust these assumptions to reflect structural changes as market expansion leads to import substitution possibilities.

As Box 7 indicates, basic employment demand is exogenously projected by sector and treated parametrically in UPED. These projections of basic employment are varied to reflect the different economic developments to be analyzed. For example, to project the impacts of a particular power plant, the direct basic employment by industrial sector involved in constructing and operating the plant would be added to a baseline basic employment projection and the sum would serve as the basic job opportunities input for that power plant's UPED run.

Basic and population dependent job opportunities are summed to produce total job opportunities at year T+1 (Box 8). This initial value for both the supply of and demand for labor are introduced into the labor market component of UPED, where they are used to calculate the projected unemployment rate as an index of the area's economic opportunities. This rate is compared against

a parametrically established "normal" range of unemployment rates. If it is higher than the upper bound of the range — the out-migration triggering rate -- this is taken to indicate inadequate opportunities for the natural increase of population and employment related out-migration at T+1 is projected. Alternatively, if it is below the lower bound, the in-migration triggering prosperity is indicated and employment related in-migration at year T+1 is projected.

The amount of migration projected is sufficient to provide the labor force required to adjust the unemployment rate to the relevant triggering rate, assuming no change in population dependent job opportunities. The demographic detail of this migration reflects cohort difference in (1) labor force participation rates, (2) migration propensities, and (3) the composition of the source population (local population for out-migration, national population for in-migration).

Of course, the assumption stressed in the previous paragraph, that job opportunities do not change as a result of migration, is invalid. The migration of workers and their families increases or decreases population dependent job opportunities. The first short dash arrows in Fig. A.1 indicate the interactive nature of the UPED solution to this interdependence problem. The iterative process continues until the calculated unemployment rate is satisfactorily close to the relevant triggering rate, at which time a solution is achieved and no further migration or employment changes are calculated. Final population, migration, and employment outputs are presented with the former being used to derive projections of households, labor force, and school age population. The solution value for projected population is then fed back into the model (long dash arrows in Fig. A.1 serve as the initial population vector for the next projection year).

A.2.2 The Spatial Allocation Model (SAM)

The Spatial Allocation Model (SAM) is a computerized process for distributing MCD-level UPED projections of population and employment among constituent CCDs. SAM allocates total regional population and sector-specific employment among CCDs subject to the employment requirements of the geographically located basic industries and simultaneously consistent with the population-serving residentiary employment.

The allocation of residentiary employment reflects trading patterns among the CCDs based upon the structure of service centers and the distribution of population. This allocation of residentiary employment projections is based upon an important simplifying assumption: the number of jobs required to fulfill residentiary demand for goods and services, on a per capita basis, is independent of the location of both the residences of the population demanding those goods and services and locations of the jobs themselves. In other words, each individual is assumed to demand the same amount of each good or service produced in the CCD regardless of which CCD he

lives in and regardless of whether his demand is met by a job located in his CCD of residence or in some other, higher order, market center CCD.

The relationship between the goods and services demanding population of one area, and the allocation of CCDs of total MCD residentiary employment is given by the elements of a "SPINT" (for SPatial INTeraction) matrix. The elements of the SPINT matrix represent the proportion of the total demand exerted by the residents in each area that will be met by jobs located in each area, e.g., a SPINT value of 0.25 relating demand in one area to supply from another indicates that 25% of the demand exerted by the residents of the demanding area would be met by jobs located in the supply area. (Including, of course, a value for own provision, r=c). Producing the SPINT matrices for each industry is the major calibration task in applying SAM. A potential model, linear in distance and employment, is used to calibrate the SPINTs in this application.

Thus, the jobs located in each CCD are the sum of the exogenously allocated basic employment and population-market center structure determined residentiary employment allocation. SAM's population allocation procedure is based, interactively, on the allocation of employment. It is recognized, however, that the CCD in which a job is located need not be the CCD of residence of the worker holding that job, i.e., the phenomenon of commuting must be dealt with. To accomplish this, a CCD x CCD matrix (COMMUT) is specified for each industry. The elements of the COMMUT matrices are the proportion of jobs in each CCD held by workers living in each CCD (including, of course, the CCD where the jobs are located — the noncommuting workers).

Application of the CCD-specific population labor force participation rate and unemployment rate assumptions to the resulting sum of all workers by their CCD of residence produces the allocation of the total MCD population projection to the CCD level and completes the allocation procedure. SAM outputs consist of yearly allocations of total population (age and sex detail are not maintained in SAM) and of employment by a 27-sector aggregation of the 66 UPED sectors.

A.2.3 The Energy Development Commuting Distribution Gravity Model

The gravity models used by APA Planning and Research to distribute the construction and operations work forces for the respective energy projects among the communities took the general form:

$$NL_i = \frac{A_i}{A_{Total}}$$

where

NL_i = The proportion of the work force (construction or operations) associated with a given project, residing in community i.

A_i = The attractiveness of community i.

A_{Total} = The sum of A_i over all the communities (in this case, Roosevelt/Myton/Ballard, Vernal/Ashley Valley, and Rangely).

The values for A_i are determined by the function:

$$A_i = \frac{POP_i}{D_{ij} B_j}$$

where

POP_i = Population of community i (1980).

D_{ij} = Distance between community i and project j.

B_j = Commuting distance elasticity, which measures the responsiveness of workers to distance from the project site.

Studies by the authors of *Characteristics and Settlement Patterns of Energy-Related Operating Workers in the Northern Great Plains* and *Construction Worker Profile* produced a commuting distance elasticity (B_j) of 1.019 for construction workers. This elasticity for construction workers was used in this study. It was assumed however, that given high gasoline prices and the relatively long distances from any community to the Uintah Basin synfuels projects, the more permanent operations workers would be more sensitive to travel. Therefore a commuting distance elasticity of 2.0 was used for operations workers.

APPENDIX B

BASELINE EMPLOYMENT AND INCOME DATA BY COUNTY

Table B.1 Historical Carbon County Employment by Industrial Sector and Year (1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	249	233	215	222	229	214	211	221	233	224	226	-2.98	1.10
Mining	987	1,065	1,039	1,033	1,087	1,350	1,744	1,712	1,668	2,209	2,325	6.46	11.49
Contract Construction	128	95	119	150	201	220	242	283	324	307	338	5.57	8.97
Manufacturing	187	179	211	256	283	276	254	296	301	308	281	8.10	0.36
Transportation, Communication, and Utilities	460	461	466	437	404	455	507	550	601	640	650	-0.22	7.39
Wholesale and Retail Trade	922	986	1,030	1,159	1,170	1,190	1,356	1,458	1,703	1,795	1,762	5.24	8.17
Finance, Insurance, and Real Estate	135	135	141	149	173	277	223	248	235	240	242	15.46	-2.67
Services	464	485	494	500	557	567	555	558	617	852	1,083	4.09	13.82
Government	1,388	1,414	1,411	1,336	1,367	1,408	1,438	1,534	1,842	1,890	1,828	0.29	5.36
Nonfarm Proprietors	470	480	475	474	543	508	545	547	568	609	650	1.57	5.05
Total	5,390	5,533	5,601	5,716	6,014	6,465	7,075	7,407	8,092	9,074	9,385	3.70	7.74

[a]Totals may not add due to rounding.

[b]NA - not available.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.2 Historical Duchesne County Employment by Industrial Sector and Year (1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	797	801	763	729	751	741	728	731	739	720	733	-1.45	-0.22
Mining	269	430	918	1,243	1,365	1,060	730	771	765	788	1,071	31.56	0.21
Contract Construction	NA	48	97	268	151	158	117	199	269	182	210	-[c]	5.86
Manufacturing	52	60	91	92	97	93	91	93	96	145	174	12.33	13.35
Transportation, Communication, and Utilities	85	87	105	179	195	169	157	156	163	170	238	14.73	7.09
Wholesale and Retail Trade	299	362	563	748	795	815	844	809	850	897	893	22.21	1.84
Finance, Insurance, and Real Estate	NA	35	60	61	81	80	74	72	88	75	81	-[c]	0.25
Services	211	205	156	243	251	228	229	234	268	279	298	1.56	5.50
Government	571	599	676	704	724	792	857	920	910	977	1,097	6.76	6.73
Nonfarm Proprietors	249	305	358	416	487	564	589	680	745	737	837	17.76	8.22
Total	2,656	2,932	3,787	4,683	4,897	4,700	4,416	4,690	4,893	4,970	5,632	12.09	3.68

[a]Totals may not add due to rounding.

[b]NA - not available.

[c]Undefined.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.3 Historical Emery County Employment by Industrial Sector and Year (1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	452	459	451	456	462	468	456	463	465	460	464	0.70	-0.17
Mining	366	336	472	642	836	1,061	1,256	1,340	1,377	1,935	2,105	23.72	14.69
Contract Construction	NA	NA	431	708	420	587	1,179	1,443	1,315	916	522	-[c]	-2.32
Manufacturing	NA	NA	16	NA	NA	NA	(10-99)	24	20	25	22	-[c]	-[c]
Transportation, Communication, and Utilities	34	37	46	74	114	152	191	298	418	486	513	34.92	27.54
Wholesale and Retail Trade	161	180	203	242	226	245	334	348	391	353	335	8.76	6.46
Finance, Insurance, and Real Estate	NA	NA	3	NA	NA	NA	(1-9)	12	22	47	65	-[c]	-[c]
Services	63	48	61	91	111	205	145	181	217	233	225	26.61	1.88
Government	370	362	356	329	339	350	358	434	606	655	716	-1.11	15.39
Nonfarm Proprietors	204	209	185	176	151	233	261	398	447	519	485	2.69	15.79
Total	1,825	1,748	2,224	2,773	2,695	3,326	4,214	4,941	5,279	5,629	5,452	12.75	10.39

[a]Totals may not add due to rounding.

[b]NA - not available.

[c]Undefined.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.4 Historical Garfield County Employment by Industrial Sector and Year (1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	281	278	249	241	233	237	232	234	237	233	236	-3.35	-0.08
Mining	NA	NA	NA	13	19	39	79	65	114	185	210	-[c]	40.03
Contract Construction	34	80	54	46	35	24	31	47	27	54	379	-6.73	73.65
Manufacturing	204	188	222	239	217	217	251	250	262	265	248	1.24	2.71
Transportation, Communication, and Utilities	46	58	51	52	52	49	57	68	72	71	85	1.27	11.65
Wholesale and Retail Trade	127	121	144	152	140	154	164	182	179	140	125	3.93	-4.09
Finance, Insurance, and Real Estate	NA	NA	NA	13	17	15	15	15	18	19	16	-[c]	1.30
Services	220	221	255	236	231	278	281	304	306	322	266	4.79	-0.88
Government	330	318	315	329	319	346	356	374	390	437	457	0.95	5.72
Nonfarm Proprietors	166	155	144	112	109	130	133	138	134	136	157	-4.77	3.85
Total	1,431	1,439	1,453	1,433	1,372	1,489	1,599	1,677	1,739	1,862	2,179	0.80	7.91

[a]Totals may not add due to rounding.

[b]NA - not available.

[c]Undefined.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.5 Historical Grand County Employment by Industrial Sector and Year (1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	70	77	71	72	74	79	79	77	77	71	75	2.45	-1.03
Mining	499	415	431	352	373	423	525	630	745	725	736	-3.25	11.71
Contract Construction	163	65	177	167	170	206	278	280	222	188	345	4.79	10.86
Manufacturing	81	74	76	85	107	83	86	91	117	90	69	0.49	-3.63
Transportation, Communication, and Utilities	186	203	210	214	203	224	200	193	226	244	245	3.79	1.81
Wholesale and Retail Trade	401	458	565	597	571	607	631	697	810	755	809	8.64	5.91
Finance, Insurance, and Real Estate	53	55	66	84	82	59	59	63	75	83	88	2.17	8.32
Services	343	372	350	324	336	368	388	431	454	374	401	1.42	1.73
Government	439	447	420	393	393	420	507	535	610	601	579	-0.88	6.63
Nonfarm Proprietors	238	243	240	279	308	270	289	323	322	368	349	2.56	5.27
Total	2,473	2,409	2,606	2,567	2,617	2,739	3,042	3,326	3,658	3,499	3,696	2.06	6.18

[a]Totals may not add due to rounding.

[b]NA - not available.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.6 Historical Uintah County Employment by Industrial Sector and Year(1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	751	721	659	628	602	622	615	627	639	620	635	-3.70	0.41
Mining	711	788	961	1,016	1,166	1,064	960	1,170	1,457	1,563	1,607	8.40	8.60
Contract Construction	180	140	227	209	278	287	216	283	423	500	270	9.78	-1.21
Manufacturing	249	323	353	360	243	287	306	306	295	238	181	2.88	-8.81
Transportation, Communication, and Utilities	177	210	301	368	427	503	464	481	478	520	611	23.23	3.97
Wholesale and Retail Trade	711	818	989	1,113	1,203	1,176	1,255	1,359	1,382	1,425	1,408	10.59	3.67
Finance, Insurance, and Real Estate	74	77	91	106	110	107	110	109	127	148	156	7.65	7.83
Services	548	684	877	958	1,016	1,066	1,085	1,128	1,193	1,297	1,459	14.23	6.48
Government	860	825	899	855	953	993	1,028	1,045	1,263	1,283	1,152	2.92	3.02
Nonfarm Proprietors	342	404	434	459	580	617	633	598	618	652	674	12.53	1.78
Total	4,603	4,990	5,791	6,072	6,578	6,722	6,672	7,106	7,875	8,246	8,153	7.87	3.94

[a]Totals may not add due to rounding.

[b]NA - not available.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.7 Historical Wayne County Employment by Industrial Sector and Year(1970-1980)[a,b]

Industry Sector	Sectoral Employment, by Year											Average Annual Compound Percent Change	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1970-1975	1975-1980
Agriculture	205	205	196	193	190	195	191	193	194	188	191	-1.00	-0.41
Mining	NA	NA	NA	NA	NA	NA	(10-99)	55	139	174	9	-[c]	-[c]
Contract Construction	NA	NA	NA	NA	NA	NA	26	49	32	55	84	-[c]	-[c]
Manufacturing	NA	NA	NA	NA	NA	NA	(10-99)	29	26	31	37	-[c]	-[c]
Transportation, Communication, and Utilities	NA	NA	NA	NA	NA	NA	(1-9)	5	5	3	3	-[c]	-[c]
Wholesale and Retail Trade	37	32	33	28	39	39	47	48	48	70	42	1.06	1.49
Finance, Insurance, and Real Estate	NA	NA	NA	NA	NA	NA	(1-9)	6	7	8	12	-[c]	-[c]
Services	31	30	32	NA	NA	NA	37	31	27	26	31	-[c]	-[c]
Government	174	175	183	192	197	211	205	214	245	234	207	3.93	-0.38
Nonfarm Proprietors	89	92	100	89	84	114	115	179	161	178	152	5.08	5.92
Total	579	567	584	566	595	672	677	809	884	967	768	3.02	2.71

[a]Totals may not add due to rounding.

[b]NA - not available.

[c]Undefined.

Source: Utah Department of Employment Security, Selected *Annual Reports* (1970-1980), and U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System (REIS)*.

Table B.8 Average Monthly Nonagricultural Wages by Industrial Sector and County, 1975-1980 (1980 $)

Industry Sector	Average Monthly Wages, by Year					
	1975	1976	1977	1978	1979	1980
Carbon County						
Mining	1,232	1,405	1,617	1,833	1,841	1,980
Contract Construction	999	927	995	1,252	1,210	1,401
Manufacturing	618	707	676	781	836	820
Transportation, Communication, and Utilities	1,058	1,165	1,343	1,478	1,636	1,725
Wholesale and Retail Trade	478	531	566	661	721	775
Finance, Insurance, and Real Estate	740	622	646	753	773	849
Services	395	438	445	479	603	704
Government	639	682	737	721	760	855
Duchesne County						
Mining	1,781	-[a]	1,936	2,084	2,010	1,834
Contract Construction	1,197	1,027	1,413	1,614	1,610	1,570
Manufacturing	898	858	842	871	1,362	1,365
Transportation, Communication, and Utilities	1,343	1,400	1,336	1,307	1,772	1,615
Wholesale and Retail Trade	699	678	698	582	733	708
Finance, Insurance, and Real Estate	840	-[a]	855	831	880	875
Services	787	804	773	773	753	787
Government	950	941	913	927	921	809
Emery County						
Mining	1,141	1,274	1,419	1,502	1,679	1,966
Contract Construction	1,465	1,760	1,979	1,981	2,197	2,410
Manufacturing	-[a]	-[a]	980	856	996	882
Transportation, Communication, and Utilities	919	1,081	1,299	1,425	1,555	1,777
Wholesale and Retail Trade	349	496	562	592	516	490
Finance, Insurance, and Real Estate	-[a]	-[a]	366	634	805	806
Services	336	437	482	579	572	716
Government	590	627	645	833	803	842

Table B.8 (Cont'd)

Industry Sector	Average Monthly Wages, by Year					
	1975	1976	1977	1978	1979	1980
Garfield County						
Mining	969	923	1,386	1,266	1,205	1,346
Contract Construction	646	973	1,149	997	1,226	1,071
Manufacturing	580	635	673	703	905	972
Transportation, Communication, and Utilities	857	903	865	948	1,093	1,214
Wholesale and Retail Trade	268	289	300	340	392	420
Finance, Insurance, and Real Estate	405	434	505	617	749	833
Services	281	338	346	395	476	640
Government	634	682	713	730	751	828
Grand County						
Mining	1,379	1,435	1,441	1,550	1,594	1,601
Contract Construction	1,496	1,954	1,666	1,458	1,342	1,702
Manufacturing	1,067	675	629	674	734	714
Transportation, Communication, and Utilities	1,496	1,500	1,507	1,400	1,362	1,279
Wholesale and Retail Trade	890	846	806	800	794	796
Finance, Insurance, and Real Estate	841	888	958	1,019	1,004	973
Services	617	576	596	612	643	662
Government	1,039	1,189	1,193	1,157	1,116	1,054
Uintah County						
Mining	766	1,169	1,250	1,345	1,526	1,754
Contract Construction	960	899	973	1,150	1,636	1,244
Manufacturing	642	671	639	730	865	988
Transportation, Communication, and Utilities	949	1,012	1,094	1,268	1,472	1,521
Wholesale and Retail Trade	642	635	645	735	604	883
Finance, Insurance, and Real Estate	-[a]	668	726	1,007	860	917
Services	596	598	643	710	783	983
Government	682	753	805	833	916	1,041

Table B.8 (Cont'd)

Industry Sector	Average Monthly Wages, by Year					
	1975	1976	1977	1978	1979	1980
Wayne County						
Mining	527	-[a]	1,141	1,185	1,393	1,461
Contract Construction	-[a]	1,025	1,270	960	1,407	1,769
Manufacturing	-[a]	-[a]	431	396	376	381
Transportation, Communication, and Utilities	-[a]	-[a]	507	582	1,019	906
Wholesale and Retail Trade	232	237	299	286	309	337
Finance, Insurance, and Real Estate	-[a]	-[a]	2,122	1,967	2,130	1,844
Services	-[a]	236	294	319	277	431
Government	546	607	623	620	683	794

[a]Actual data not shown to avoid disclosure of individual firm information.

Source: Utah Department of Employment Security, selected *Annual Reports* (1975-1980).

Table B.9 Total Personal Income by County and Year, 1970-1980 (1980 $ x 10^3)

County	Personal Income, by Year										
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Carbon	100,946	104,868	117,654	127,624	131,653	145,475	160,741	172,947	186,002	223,936	203,491
Duchesne	37,424	41,332	57,351	71,543	75,775	73,454	75,754	78,902	83,583	98,044	92,370
Emery	24,986	23,423	31,851	40,197	39,445	45,207	58,755	68,813	76,062	88,855	79,334
Garfield	16,545	18,223	19,789	20,565	20,311	19,117	21,857	22,709	22,906	23,778	25,764
Grand	44,045	41,398	47,593	48,788	49,943	52,837	60,553	64,561	67,976	75,189	73,137
Uintah	68,660	73,036	90,634	103,874	117,606	118,890	122,909	131,950	146,157	175,372	162,231
Wayne	6,954	7,269	8,558	9,483	9,133	9,094	9,306	10,114	11,974	13,020	12,167
State of Utah	7,275,680	7,712,398	8,339,130	8,804,252	8,904,144	9,109,633	9,785,854	10,383,316	11,015,672	11,464,559	11,248,719

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, Table 5 (April 1982), and the Utah Population Committee.

APPENDIX C

HOUSING DEMAND BY COUNTY AND COMMUNITY

Table C.1 Change in Housing Demand by County and Community Resulting from the Household Projections of the High Commercial Development Scenario[a,b]

County/Community	Change in Housing Demand, by Type and Year (No. of Units)															Cumulative Growth Factor, 1985-2005		
	1985			1990			1995			2000			2005					
	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes
Carbon County	17	5	7	2,430	608	1,013	3,030	758	1,263	3,315	829	1,382	4,461	1,116	1,859	262	223	266
East Carbon CCD[c]	5	2	2	680	170	284	789	198	329	944	236	393	1,286	322	536	257	161	268
East Carbon	3	1	2	503	126	210	584	146	244	698	175	291	951	238	397	317	238	199
Sunnyside	2	1	1	177	45	74	206	52	86	246	62	103	335	84	140	168	84	140
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Helper CCD	2	1	1	203	51	85	210	53	88	210	53	88	270	68	113	135	68	113
Helper	2	1	1	122	31	51	126	32	53	126	32	53	162	41	68	81	41	68
Scofield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Areas	1	1	1	81	21	34	84	21	35	84	21	35	108	27	45	108	27	45
Price CCD	11	3	5	1,547	387	645	2,032	508	847	2,163	541	901	2,907	727	1,211	264	242	242
Hiawatha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Price	8	2	3	1,006	252	419	1,321	331	551	1,406	352	586	1,890	473	788	236	237	263
Wellington	2	1	1	279	70	116	366	92	153	390	98	163	524	131	218	262	131	218
Unincorporated Areas	2	1	1	263	66	110	346	87	144	368	92	154	494	124	206	247	124	206
Duchesne County	0	0	0	165	42	69	303	76	126	183	46	77	188	47	79	-d	-d	-d
Duchesne CCD	0	0	0	27	7	11	44	11	18	41	11	17	42	11	18	-d	-d	-d
Duchesne	0	0	0	27	7	11	44	11	18	41	11	17	42	11	18	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Roosevelt CCD	0	0	0	138	35	58	260	65	109	143	36	60	147	37	61	-d	-d	-d
Altamont	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Myton	0	0	0	5	2	2	8	2	4	5	2	2	5	2	2	-d	-d	-d
Roosevelt	0	0	0	83	21	35	156	39	65	86	22	36	88	22	37	-d	-d	-d
Unincorporated Areas	0	0	0	51	13	22	96	24	40	53	14	22	54	14	23	-d	-d	-d
Emery County	3	1	1	410	103	171	2,114	529	881	699	175	292	752	188	313	66	100	166
Castle Dale-Huntington CCD	2	1	1	255	64	107	716	179	298	313	79	131	398	100	166	199	100	166
Castle Dale	1	1	1	90	23	38	251	63	105	110	28	46	140	35	58	140	35	58
Cleveland	0	0	0	16	4	7	44	11	18	19	5	8	24	6	10	-d	-d	-d
Elmo	0	0	0	11	3	5	29	8	12	13	4	6	17	5	7	-d	-d	-d
Huntington	1	1	1	64	16	27	179	45	75	78	20	33	100	25	42	100	25	42
Orangeville	1	1	1	64	16	27	179	45	75	78	20	33	100	25	42	100	25	42
Unincorporated Areas	0	0	0	13	4	6	36	9	15	16	4	7	20	5	9	-d	-d	-d
Emery-Ferron CCD	0	0	0	17	5	7	239	60	100	44	11	19	45	12	19	-d	-d	-d
Clawson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Emery	0	0	0	5	2	2	60	15	25	11	3	5	12	3	5	-d	-d	-d
Ferron	0	0	0	13	4	6	179	45	75	33	9	14	34	9	14	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Green River CCD	1	1	1	138	35	58	1,160	290	484	343	86	143	308	77	129	308	77	129
Green River	1	1	1	119	30	50	1,000	250	416	295	74	123	265	67	111	265	67	111
Unincorporated Areas	0	0	0	20	5	8	163	41	68	48	12	20	44	11	18	-d	-d	-d
Garfield County	0	0	0	63	16	27	237	60	99	249	63	104	255	64	107	-d	-d	-d
Escalante CCD	0	0	0	63	16	27	237	60	99	249	63	104	255	64	107	-d	-d	-d
Boulder	0	0	0	7	2	3	24	6	10	25	7	11	26	7	11	-d	-d	-d
Escalante	0	0	0	57	15	24	214	54	89	224	56	94	230	58	96	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Grand County	27	7	12	509	128	212	3,007	752	1,253	1,350	338	563	1,391	348	580	52	50	48
Thompson CCD	27	7	12	490	123	204	2,907	727	1,212	1,296	324	540	1,329	333	554	49	48	46
Uintah County	0	0	0	323	81	135	578	145	241	332	83	139	340	85	142	-d	-d	-d
Uintah-Ouray CCD	0	0	0	103	26	43	159	40	66	108	27	45	111	28	46	-d	-d	-d
Ballard	0	0	0	41	11	17	64	16	27	44	11	18	45	12	19	-d	-d	-d
Unincorporated Areas	0	0	0	62	16	26	95	24	40	65	17	27	66	17	28	-d	-d	-d
Vernal CCD	0	0	0	221	56	92	419	105	175	225	57	94	230	58	96	-d	-d	-d
Vernal	0	0	0	111	28	46	210	53	88	113	28	47	115	29	48	-d	-d	-d
Unincorporated Areas	0	0	0	111	28	46	210	53	88	113	28	47	115	29	48	-d	-d	-d
Wayne County	0	0	0	35	9	15	1,078	270	449	497	125	207	539	135	225	-d	-d	-d
Hanksville CCD	0	0	0	35	9	15	1,078	270	449	497	125	207	539	135	225	-d	-d	-d

[a]It is assumed that each household requires a housing unit, thereby resulting in a one-to-one correspondence between household projections generated by UPED and housing demand.

[b]Totals may not add due to rounding.

[c]Census County Division (CCD).

[d]Undefined.

Table C.2 Change in Housing Demand by County and Community Resulting from the Household Projections of the Low Commercial Development Scenario[a,b]

County/Community	Change in Housing Demand, by Type and Year (No. of Units)															Cumulative Growth Factor, 1985-2005		
	1985			1990			1995			2000			2005					
	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes
Carbon County	17	5	7	621	156	259	1,305	327	544	1,473	369	614	1,523	381	635	90	76	91
East Carbon CCD[c]	5	2	2	176	44	74	365	92	152	439	110	183	453	114	189	91	57	95
East Carbon	3	1	2	131	33	55	270	68	113	325	82	136	335	84	140	112	84	70
Sunnyside	2	1	1	46	12	19	95	24	40	114	29	48	118	30	49	59	30	49
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Helper CCD	2	1	1	47	12	20	94	24	39	78	20	33	81	21	34	41	21	34
Helper	2	1	1	29	8	12	57	15	24	47	12	20	48	12	20	24	12	20
Scofield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Unincorporated Areas	1	1	1	19	5	8	38	10	16	32	8	13	33	9	14	33	9	14
Price CCD	11	3	5	398	100	166	847	212	353	956	239	399	990	248	413	90	83	83
Hiawatha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Price	8	2	3	259	65	108	551	138	230	621	156	259	644	161	269	81	81	90
Wellington	2	1	1	72	18	30	153	39	64	173	44	72	179	45	75	90	45	75
Unincorporated Areas	2	1	1	68	17	29	144	36	60	163	41	68	169	43	71	85	43	71
Duchesne County	22	6	9	59	15	25	62	16	26	69	18	29	73	19	31	3	3	3
Duchesne CCD	0	0	0	2	1	1	2	1	1	2	1	1	2	1	1	-d	-d	-d
Duchesne	0	0	0	2	1	1	2	1	1	2	1	1	2	1	1	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Roosevelt CCD	21	6	9	59	15	25	61	16	25	68	17	29	71	18	30	3	3	3
Altamont	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Myton	1	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1
Roosevelt	13	4	6	35	9	15	37	10	16	41	11	17	43	11	18	3	3	3
Unincorporated Areas	8	2	4	22	6	9	23	6	10	26	7	11	27	7	11	3	4	3
Emery County	3	1	1	161	41	67	339	85	141	193	49	81	199	50	83	66	50	83
Castle Dale-Huntington CCD	2	1	1	83	21	35	122	31	51	114	29	48	118	30	49	59	30	49
Castle Dale	1	1	1	29	8	12	43	11	18	41	11	17	42	11	18	42	11	18
Cleveland	0	0	0	5	2	2	8	2	3	7	2	3	8	2	3	-d	-d	-d
Elmo	0	0	0	4	1	2	5	2	2	5	2	2	5	2	2	-d	-d	-d
Huntington	1	1	1	21	6	9	31	8	13	29	8	12	30	8	13	30	8	13
Orangeville	1	1	1	21	6	9	31	8	13	29	8	12	30	8	13	30	8	13
Unincorporated Areas	0	0	0	5	2	2	6	2	3	6	2	3	6	2	3	-d	-d	-d
Emery-Ferron CCD	0	0	0	15	4	6	7	2	3	6	2	3	6	2	3	-d	-d	-d
Clawson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Emery	0	0	0	4	1	2	2	1	1	2	1	1	2	1	1	-d	-d	-d
Ferron	0	0	0	11	3	5	5	2	2	5	2	2	5	2	2	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Green River CCD	1	1	1	63	16	27	210	53	88	74	19	31	76	19	32	76	19	32
Green River	1	1	1	54	14	23	190	46	76	63	16	27	65	17	27	65	17	27
Unincorporated Areas	0	0	0	9	3	4	30	8	13	11	3	5	11	3	5	-d	-d	-d
Garfield County	0	0	0	6	2	3	23	6	10	21	6	9	22	6	9	-d	-d	-d
Escalante CCD	0	0	0	6	2	3	23	6	10	21	6	9	22	6	9	-d	-d	-d
Boulder	0	0	0	1	1	1	3	1	1	3	1	1	3	1	1	-d	-d	-d
Escalante	0	0	0	6	2	3	20	5	8	20	5	8	20	5	8	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-d	-d	-d
Grand County	28	7	12	549	138	229	563	141	235	414	104	173	429	108	179	15	15	15
Thompson CCD	27	7	12	538	135	224	542	136	226	396	99	165	409	103	171	15	15	14
Uintah County	36	9	15	111	28	47	114	29	48	126	32	53	132	33	55	4	4	4
Uintah-Ouray CCD	12	3	5	62	16	26	60	15	25	65	17	27	67	17	28	6	6	6
Ballard	5	2	2	25	7	11	24	6	10	26	7	11	27	7	11	5	4	6
Unincorporated Areas	7	2	3	37	10	16	36	9	15	39	10	16	41	11	17	6	6	6
Vernal CCD	26	7	11	51	13	21	54	14	23	62	26	16	65	17	27	3	2	2
Vernal	13	4	6	26	7	11	27	7	12	31	8	13	33	9	14	3	2	2
Unincorporated Areas	13	4	6	26	7	11	27	7	12	31	8	13	33	9	14	3	2	2
Wayne County	0	0	0	35	9	15	210	53	88	127	32	53	131	33	55	-d	-d	-d
Hanksville CCD	0	0	0	35	9	15	210	53	88	127	32	53	131	33	55	-d	-d	-d

[a]It is assumed that each household requires a housing unit, thereby resulting in a one-to-one correspondence between household projections generated by UPED and housing demand.

[b]Totals may not add due to rounding.

[c]Census County Division (CCD).

[d]Undefined.

Table C.3 Change in Housing Demand by County and Community Resulting from the Household Projections of the Other Energy Projects[a,b]

County/Community	Change in Housing Demand, by Type and Year (No. of Units)															Cumulative Growth Factor, 1985-2005		
	1985			1990			1995			2000			2005					
	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes	Single Family	Multi-Family	Mobile Homes
Carbon County	2,319	580	966	2,001	501	834	2,541	636	1,059	2,623	656	1,093	2,793	699	1,164	1.20	1.20	1.20
East Carbon CCD[c]	563	141	235	246	62	103	278	70	116	278	70	116	286	72	119	-d	-d	-d
East Carbon	417	105	174	182	46	76	206	52	86	206	52	86	212	53	88	-d	-d	-d
Sunnyside	147	37	61	65	17	27	72	18	30	72	18	30	75	19	31	-d	-d	-d
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-e	-e	-e
Helper CCD	299	75	125	221	56	92	263	66	110	263	66	110	273	69	114	-d	-d	-d
Helper	179	45	75	132	33	55	158	40	66	158	40	66	164	41	68	-d	-d	-d
Scofield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-e	-e	-e
Unincorporated Areas	120	30	50	89	23	37	105	27	44	105	27	44	110	28	46	-d	-d	-d
Price CCD	1,458	365	608	1,533	384	639	2,003	501	835	2,082	521	868	2,235	559	931	1.53	1.53	1.53
Hiawatha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-e	-e	-e
Price	948	237	395	997	250	416	1,302	326	543	1,354	339	564	1,453	364	606	1.53	1.54	1.53
Wellington	263	66	110	276	69	115	361	91	151	375	94	157	402	101	168	1.53	1.53	1.53
Unincorporated Areas	248	62	104	261	66	109	341	86	142	354	89	148	380	95	159	1.53	1.53	1.53
Duchesne County	1,010	253	421	1,826	457	761	2,169	543	904	2,541	636	1,059	2,925	732	1,219	2.90	2.89	2.90
Roosevelt CCD	1,014	254	423	1,797	450	749	2,145	537	894	2,506	627	1,044	2,859	715	1,191	2.82	2.81	2.82
Myton	35	9	15	63	16	27	75	19	32	88	22	37	101	26	42	2.89	2.89	2.80
Roosevelt	709	178	296	1,259	315	525	1,501	376	626	1,754	439	731	2,002	501	834	2.82	2.81	2.82
Unincorporated Areas	270	68	113	476	119	198	570	143	238	665	167	277	756	189	315	2.80	2.78	2.79
Emery County	374	94	156	329	83	137	536	134	223	545	137	227	561	141	234	1.50	1.50	1.50
Castle Dale-Huntington CCD	287	72	120	228	57	95	366	92	153	373	94	156	392	98	164	1.37	1.36	1.37
Castle Dale	101	26	42	80	20	34	129	33	54	131	33	55	138	35	58	1.37	1.35	1.38
Cleveland	18	5	8	14	4	6	23	6	10	23	6	10	24	6	10	1.33	1.2	1.25
Elmo	12	3	5	9	3	4	15	4	7	15	4	7	16	4	7	1.33	1.33	1.40
Huntington	72	18	30	57	9	24	92	23	38	93	24	39	98	25	41	1.36	1.39	1.37
Orangeville	72	18	30	57	9	24	92	23	38	93	24	39	98	25	41	1.36	1.39	1.37
Unincorporated Areas	15	4	6	12	3	5	19	5	8	19	5	8	20	5	9	1.33	1.25	1.50
Emery-Ferron CCD	36	9	15	87	22	37	155	39	65	155	39	65	154	39	64	4.28	4.33	4.27
Clawson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-e	-e	-e
Emery	9	3	4	22	6	9	39	10	17	39	10	17	39	10	16	4.33	3.33	4.00
Ferron	27	7	11	66	17	28	117	29	49	117	29	49	116	29	48	4.30	4.14	4.36
Unincorporated Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-e	-e	-e
Green River CCD	52	13	22	13	4	6	15	4	7	15	4	7	16	4	7	-d	-d	-d
Green River	45	12	19	11	3	5	14	4	6	14	4	6	14	4	6	-d	-d	-d
Unincorporated Areas	8	2	3	2	1	1	3	1	1	3	1	1	3	1	1	-d	-d	-d
Uintah County	2,910	728	1,213	6,317	1,580	2,632	7,723	1,931	3,218	8,886	2,222	3,703	10,001	2,501	4,167	3.44	3.44	3.44
Uintah-Ouray CCD	92	23	38	159	40	67	164	41	68	176	44	74	189	48	79	2.05	2.09	2.03
Ballard	46	12	19	80	20	34	82	21	34	89	23	37	95	24	40	2.07	2.00	2.11
Unincorporated Areas	46	12	19	80	20	33	82	21	34	88	22	37	95	24	40	2.07	2.00	2.11
Vernal CCD	2,819	705	1,175	6,137	1,535	2,557	7,551	1,888	3,147	8,705	2,177	3,627	9,866	2,467	4,111	3.50	3.50	3.50
Vernal	1,254	314	523	2,665	667	1,111	3,301	826	1,376	3,801	951	1,584	4,274	1,069	1,781	3.50	3.50	3.50
Naples	564	141	235	1,227	307	512	1,511	378	630	1,741	436	726	1,973	494	822	3.62	3.61	3.62
Unincorporated Areas	1,001	251	417	2,245	562	936	2,741	686	1,142	3,164	791	1,318	3,620	905	1,508	3.62	3.61	3.62

[a]It is assumed that each household requires a housing unit, thereby resulting in a one-to-one correspondence between household projections generated by UPED and housing demand.

[b]Totals may not add due to rounding.

[c]Census County Division (CCD).

[d]These CCDs and communities are expected to have a reduction in demand for housing units over the 1985-2005 time frame. Consequently, this reduction in demand cannot be reflected in a cumulative growth factor.

[e]Undefined.

APPENDIX D

FISCAL PROFILES OF COUNTIES AND COMMUNITIES

Table D.1 Fiscal Profile of Carbon County and Select Communities of Interest

Budget Category	Carbon County		East Carbon City		Helper	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	115.900	-	3.540	-	6.860
Mill levy	-	16.00	-	18.18	-	8.00
Revenues (10^6)						
Property taxes	1.748	2.260	0.048	0.060	0.060	0.058
Sales taxes	0.286	0.300	0.051	0.055	0.189	0.200
Federal transfers	0.586	1.217	0.017	0.014	0.024	0.033
State transfers	0.333	0.235	0.015	0.021	0.025	0.024
Service charges	0.505	0.543	0.127	0.129	1.166	1.285
Interest	0.249	0.160	-	-	-	-
Miscellaneous	0.571	0.477	0.020	0.117	0.367	0.305
Total Revenues	4.278	5.192	0.278	0.396	1.831	1.905
Expenditures (10^6)						
Law enforcement	0.596	0.755	0.145	0.144	0.123	0.145
Fire protection	0.007	0.100	0.009	0.015	0.067	0.026
Public health	0.362	0.438	-	-	0.004	0.015
Roads/streets	0.796	1.070	0.024	0.040	0.118	0.123
Recreation	0.099	0.165	0.003	0.004	0.033	0.053
Agriculture	0.180	0.211	-	-	-	-
General administration	2.280	2.441	0.043	0.046	-	-
Planning	-	-	-	-	-	-
Bond retirement	-	-	0.024	0.024	0.048	0.048
Utilities	-	-	0.166	0.182	1.118	1.285
Total Expenditures	4.320	5.180	0.414	0.455	1.511	1.695

Table D.1 (Cont'd)

Budget Category	Price		Sunnyside		Wellington	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	28.668	-	0.979	-	3.137
Mill levy	-	14.35	-	6.00	-	11.16
Revenues (10^6)						
Property taxes	0.356	0.390	0.006	0.006	0.019	0.030
Sales taxes	0.854	1.160	0.026	0.025	0.033	0.050
Federal transfers	0.222	0.228	0.005	0.005	0.015	0.019
State transfers	0.085	0.103	0.004	0.003	0.007	0.016
Service charges	4.144	4.925	0.034	0.034	0.209	0.297
Interest	-	-	-	-	-	-
Miscellaneous	0.912	1.142	0.125	0.165	0.045	0.053
Total Revenues	6.573	7.948	0.200	0.238	0.328	0.465
Expenditures (10^6)						
Law enforcement	0.456	0.649	0.032	0.038	0.022	0.025
Fire protection	0.127	0.129	0.002	0.003	0.004	0.003
Public health	-	-	-	-	-	-
Roads/streets	0.632	0.751	0.009	0.013	0.009	0.012
Recreation	0.323	0.473	0.022	0.027	0.003	0.004
Agriculture	-	-	-	-	-	-
General administration	0.873	0.971	0.106	0.141	0.124	0.122
Planning	0.020	0.010	-	-	-	-
Bond retirement	-	0.046	-	-	-	-
Utilities	3.945	4.990	0.022	0.046	0.183	0.296
Total Expenditures	6.376	8.019	0.193	0.268	0.345	0.462

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table D.2 Fiscal Profile of Duchesne County and Select Communities of Interest

Budget Category	Duchesne County		Duchesne City		Roosevelt	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	205.159	-	3.599	-	14.529
Mill levy	-	8.54	-	17.00	-	17.87
Revenues (10^6)						
Property taxes	1.775	2.623	0.058	0.063	0.196	0.249
Sales taxes	0.199	0.200	0.047	0.048	0.547	0.625
Federal transfers	0.746	0.458	0.019	0.036	0.143	0.120
State transfers	1.248	0.542	0.024	0.025	0.178	0.050
Service charges	0.164	0.180	0.211	0.295	0.919	1.105
Royalties	0.403	0.130	-	-	-	-
Miscellaneous	0.339	2.418	0.064	0.164	0.372	0.456
Total Revenues	4.874	6.551	0.423	0.631	2.355	2.605
Expenditures (10^6)						
Law enforcement	0.438	0.661	0.091	0.118	0.461	0.577
Fire protection	0.096	0.080	0.009	0.013	0.047	0.046
Public health	0.181	1.247	-	-	-	-
Roads/streets	1.693	1.822	0.016	0.013	0.276	0.202
Recreation	0.111	0.154	0.020	0.021	0.111	0.249
Agriculture	0.215	0.191	-	-	-	-
General administration	1.027	1.248	0.052	0.234	0.293	0.367
Planning	-	-	-	-	0.018	0.026
Bond retirement	0.448	1.138	0.015	0.015	0.088	0.182
Utilities	-	-	0.140	0.220	0.881	1.022
Total Expenditures	4.209	6.541	0.343	0.634	2.175	2.671

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table D.3 Fiscal Profile of Emery County and Select Communities of Interest

Budget Category	Emery County		Castle Dale City		Cleveland	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	233.820	-	3.893	-	0.844
Mill levy	-	16.20	-	14.00	-	11.00
Revenues (10^6)						
Property taxes	3.241	3.265	0.066	0.051	-	0.010
Sales taxes	0.098	0.095	0.102	0.100	-	0.013
Federal transfers	0.595	0.492	0.019	0.010	-	0.002
State transfers	0.419	0.505	0.014	0.012	-	0.004
Service charges	0.054	0.049	0.158	0.059	-	0.012
Interest	0.389	0.200	-	-	-	-
Miscellaneous	1.202	1.847	0.095	0.126	-	0.033
Total Revenues	5.998	6.453	0.454	0.358	-	0.074
Expenditures (10^6)						
Law enforcement	1.256	0.182	0.017	0.018	-	0.001
Fire protection	0.132	0.125	0.011	0.040	-	0.004
Public health	0.243	0.214	-	-	-	-
Roads/streets	1.818	2.507	0.017	0.056	-	0.016
Recreation	0.135	0.100	0.077	0.075	-	0.011
Agriculture	0.108	0.107	-	-	-	-
General administration	1.830	2.932	0.092	0.099	-	0.043
Planning	-	-	0.003	0.003	-	-
Bond retirement	0.277	0.285	0.006	0.005	-	-
Utilities	-	-	0.195	0.138	-	-
Total Expenditures	5.799	6.452	0.418	0.434	-	0.075

Table D.3 (Cont'd)

Budget Category	Elmo		Emery		Ferron	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	0.591	-	0.601	-	3.377
Mill levy	-	11.00	-	17.65	-	18.65
Revenues (10^6)						
Property taxes	-	0.005	-	0.010	0.049	0.057
Sales taxes	-	0.019	-	0.010	0.053	0.058
Federal transfers	-	0.001	-	0.002	0.009	0.008
State transfers	-	0.002	-	0.003	0.019	0.009
Service charges	-	0.019	-	0.036	0.137	0.160
Interest	-	-	-	-	-	-
Miscellaneous	-	0.004	-	0.020	0.080	0.060
Total Revenues	-	0.050	-	0.081	0.347	0.352
Expenditures (10^6)						
Law enforcement	-	-[c]	-	-	-	-
Fire protection	-	0.001	-	0.001	0.025	0.033
Public health	-	-	-	-	-	-
Roads/streets	-	0.001	-	-	0.067	0.038
Recreation	-	0.002	-	0.001	0.018	0.026
Agriculture	-	-	-	-	-	-
General administration	-	0.006	-	0.043	0.046	0.063
Planning	-	-	-	-	0.010	0.012
Bond retirement	-	-	-	-	-	-
Utilities	-	0.019	-	0.015	0.148	0.181
Total Expenditures	-	0.029	-	0.060	0.314	0.353

Table D.3 (Cont'd)

Budget Category	Green River		Huntington		Orangeville	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	2.287	-	5.091	-	2.704
Mill levy	-	21.00	-	14.25	-	21.63
Revenues (10^6)						
Property taxes	0.062	0.065	-	0.066	0.044	0.052
Sales taxes	0.129	0.132	-	0.118	0.044	0.050
Federal transfers	0.005	0.006	-	0.014	0.006	0.009
State transfers	0.007	0.008	-	0.013	0.012	0.008
Service charges	-[c]	-	-	0.225	0.076	0.075
Interest	-	-	-	-	-	-
Miscellaneous	0.053	0.064	-	0.141	0.061	0.042
Total Revenues	0.256	0.275	-	0.577	0.243	0.236
Expenditures (10^6)						
Law enforcement	0.028	0.042	-	0.038	-	0.015
Fire protection	0.014	0.013	-	0.018	0.019	0.013
Public health	-	-	-	-	-	-
Roads/streets	0.046	0.119	-	0.046	0.042	0.023
Recreation	0.014	0.029	-	0.028	0.024	0.010
Agriculture	-	-	-	-	-	-
General administration	0.024	0.088	-	0.245	-	-
Planning	-	0.002	-	0.012	0.008	0.023
Bond retirement	-	0.029	-	-	-	-
Utilities	-	-	-	0.201	0.075	0.074
Total Expenditures	0.126	0.322	-	0.588	0.168	0.158

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

[c]Less than $1,000 per annum.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table D.4 Fiscal Profile of Garfield County and Select Communities of Interest

Budget Category	Garfield County		Boulder		Escalante	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	39.831	-	0.446	-	1.600
Mill levy	-	6.80	-	5.00	-	10.50
Revenues (10^6)						
Property taxes	0.282	0.315	-	0.002	-	0.020
Sales taxes	0.075	0.070	-	0.001	-	0.017
Federal transfers	0.425	0.108	-	0.003	-	0.004
State transfers	0.453	0.525	-	0.007	-	0.006
Service charges	0.474	0.417	-	0.002	-	0.032
Interest	0.159	0.140	-	-	-	-
Miscellaneous	0.277	0.691	-	0.003	-	0.017
Total Revenues	2.145	2.266	-	0.018	-	0.096
Expenditures (10^6)						
Law enforcement	0.205	0.206	-	-[d]	-	0.005
Fire protection			-	-[d]	-	0.004
Public health	0.060	0.062	-	-	-	-
Roads/streets	0.515	0.620	-	0.002	-	0.014
Recreation	0.021	0.034	-	0.003	-	-
Agriculture	0.033	0.036	-	-	-	-
General administration	0.964	0.425	-	0.005	-	0.022
Bond retirement	0.037	0.035	-	-	-	0.007
Utilities	-	-	-	-[d]	-	0.020
Miscellaneous[c]	0.310	0.312	-	-	-	-
Total Expenditures	2.145	1.730	-	0.010	-	0.072

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

[c]Ticaboo.

[d]Less than $1,000 per annum.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table D.5 Fiscal Profile of Grand County

Budget Category	Grand County	
	Average Annual[a]	Current Annual[b]
Revenue Base		
Assessed valuation (10^6)	-	60.56
Mill levy	-	8.11
Revenues (10^6)		
Property taxes	0.599	0.572
Sales taxes	0.183	0.150
Federal transfers	0.446	0.218
State transfers	0.351	0.377
Service charges	0.049	0.033
Interest	0.152	0.055
Miscellaneous	0.996	1.232
Total Revenues	2.776	2.637
Expenditures (10^6)		
Law enforcement	0.444	0.512
Fire protection	0.005	0.005
Public health	0.106	0.060
Roads/streets	0.691	0.764
Recreation	0.037	0.042
Agriculture	0.009	0.015
General administration	1.483	1.240
Total Expenditures	2.776	2.637

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table D.6 Fiscal Profile of Uintah County and Select Communities of Interest

Budget Category	Uintah County		Ballard		Naples	
	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]	Average Annual[a]	Current Annual[b]
Revenue Base						
Assessed valuation (10^6)	-	252.757	-	4.381	-	-
Mill levy	-	9.51	-	0.51	-	-
Revenues (10^6)						
Property taxes	2.234	3.191	-	-	-	-
Sales taxes	0.762	0.250	-	0.046	-	0.338
Federal transfers	1.036	1.297	-	0.008	-	0.050
State transfers	1.403	0.480	-	0.008	-	0.030
Service charges	0.103	0.104	-	-	-	-
Interest	0.705	0.390	-	-	-	-
Private contributions	5.187	0.301	-	-	-	-
Miscellaneous	6.357	4.407	-	0.006	-	0.235
Total Revenues	17.787	10.420	-	0.068	-	0.653
Expenditures (10^6)						
Law enforcement	0.702	0.833	-	0.054	-	0.125
Fire protection	0.072	0.156	-	-	-	0.010
Public health	0.482	1.923	-	-	-	-
Roads/streets	10.246	2.650	-	0.002	-	0.150
Recreation	0.529	0.739	-	-	-	0.005
Agriculture	0.086	0.114	-	-	-	-
General administration	2.517	4.113	-	0.010	-	0.172
Planning	-	-	-	-	-	-
Bond retirement	0.271	0.260	-	0.002	-	0.190
Utilities	-	-	-	-	-	-
Total Expenditures	14.905	10.788	-	0.068	-	0.652

Table D.6 (Cont'd)

Budget Category	Vernal	
	Average Annual[a]	Current Annual[b]
Revenue Base		
Assessed valuation (10^6)	-	35.738
Mill levy	-	1.80
Revenues (10^6)		
Property taxes	0.064	0.075
Sales taxes	1.370	1.600
Federal transfers	0.122	0.015
State transfers	0.097	0.062
Service charges	1.624	1.846
Interest	-	-
Private contributions	-	-
Miscellaneous	1.327	1.351
Total Revenues	4.604	4.949
Expenditures (10^6)		
Law enforcement	0.731	1.020
Fire protection	0.065	0.044
Public health	-	-
Roads/streets	0.568	0.762
Recreation	0.113	0.142
Agriculture	-	-
General administration	1.345	0.962
Planning	0.048	0.070
Bond retirement	0.080	0.108
Utilities	1.710	1.975
Total Expenditures	4.660	5.083

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

Table D.7 Fiscal Profile of Wayne County

Budget Category	Wayne County	
	Average Annual[a]	Current Annual[b]
Revenue Base		
Assessed valuation (10^6)	-	6.682
Mill levy	-	12.16
Revenues (10^6)		
Property taxes	0.092	0.097
Sales taxes	0.025	0.025
Federal transfers	0.257	0.164
State transfers	0.233	0.287
Service charges	0.031	0.033
Miscellaneous	0.280	0.199
Total Revenues	0.918	0.805
Expenditures (10^6)		
Law enforcement	0.085	0.089
Fire protection	0.016	0.012
Public health	0.052	0.035
Roads/streets	0.290	0.300
Recreation	0.037	0.056
Agriculture	0.030	0.034
General administration	0.412	0.235
Total Expenditures	0.922	0.761

[a]Average annual revenues and expenditures are presented for calendar years 1980 through 1982 for the counties and for fiscal years 1981 and 1982 for the communities.

[b]Current annual revenues and expenditures are presented for calendar year 1983 for the counties and for fiscal year 1983 for the communities.

Source: adapted from Nellis, Lee, and John K. Nicholson, Utah State University Foundation, unpublished information (June 1983).

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